

CAPITAL FORMATION, CAPITAL STOCK AND  
CAPITAL/OUTPUT RATIOS  
(Concepts, Definitions, Data, 1850-1975)

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### Introductory Remark

The Energy Program of IIASA looks into energy strategies for the transition from today's infrastructure into a future's energy system that permits the supply of very large and practically unlimited amounts of energy. Such supply systems tend to be very capital intensive. A kW at the end use side can easily cost \$3000. In that case it is important to consider more generally the problem of capital formation.

The present compilation of Mrs. Doblin is an attempt by the IIASA Energy Program to review and compile relevant data. The IIASA energy program is primarily science and engineering oriented and does not claim to substitute for professional economic investigations. But nevertheless it is necessary to consider and evaluate the economic data pool as it appears to be available. So this paper is meant to serve as a working paper for the purposes of the IIASA program.



Wolf Häfele

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## Preface

There is considerable concern about a possible general capital shortage, and more specifically the question is raised whether there will be enough capital over the next 30 years to permit the expansion of traditional energy supplies and the transition from conventional to non-conventional fuel sources with appropriate expansion and changes in patterns of transportation. The amounts of future long-term capital required may further be increased by the demands for environmental protection.

The following study is concerned only with the development of capital in the past. The past means going back to the mid 19th century for the presently developed countries (US, UK, FRG, France, Japan) to look at capital formation and capital stock. A more recent past, 1950 to 1974 was studied both because more recent data are more reliable, and for the growth of the more narrowly defined business capital stock and capital output ratios, for the US, F.R.G. and the world.

The purpose of this look into the past was to detect from a series of statistical facts at macro-economic levels any clues on the behavior of capital formation under the impact of innovation industries, that might be of relevance for the future availability of capital stock. While it is fully acknowledged that the past can not be seen as blueprint for the future, and with due reservations on the quality of the statistical evidence, it is hoped that the many data compiled for the study may serve a useful purpose in establishing the range, if not the absolute amounts, of some of the variables used in modelling capital demands by the energy sector.

At this point, I should like to emphasize that the historical chapter on capital does not attempt to study all aspects of capital formation. No reference is made to the institutional questions, except for long term series of bank and prime rates, the capital market has been ignored, including the question of how much of the capital requirements could be met through self-financing. Likewise, fiscal policy (re-distribution of income, corporate taxation) or monetary theory (i.e. how changes in money supply determine a nation's economic course) that bear on the origin of capital formation, are not considered.

We have looked at Schumpeter's classical example of the "Railroadization" as a basic innovation industry with large scale capital requirements surpassing the capacities of individual entrepreneurs, and an industry where profitability cannot be achieved within the time horizon that most investors care to envisage.<sup>1</sup> The history of the financing of railroads and other industries in the 19th and early 20th century might lend credence to the statement that "the shortage of capital is an optical illusion", especially at macro-economic level in the developed countries. The question is whether towards the end of the 20th century, this statement applies for the developed and developing countries to meet the capital requirements of the innovation industries of the future? This matter may be considered in the light of the thoughts developed by Professor Fritsch on the relationship between "tension factors" and "adjustors".<sup>1a</sup>

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<sup>1</sup> See Joseph A. Schumpeter, *Business Cycles*, McGraw Hill, New York, 1939. See in particular Vol.I., Chapter VII, Historical Outlines.

<sup>1a</sup> See Bruno Fritsch, *Ein Projektorientiertes, Heuristisches Verfahren zur Modellierung von Politisch, Ökonomisch und Ökologisch Relevanten Globalen Zusammenhängen* [Paper 76/8]. Institut für Wirtschaftsforschung, Eidgenössische Technische Hochschule, Zürich, September 1976.

Introduction: The Growth of GDP. (Historic Growth Rates; Projection Targets).

History is full of the examples by which "to illustrate the nature and modis operandi of innovation, in particular the way in which innovation produces prosperity and depression"<sup>2</sup>. The various Appendix Tables show how population, G.D.P., and capital grew, and how prices and interest rates moved in some of our presently developed countries, from the mid 19th century to date. This period was marked by long-term or secular (i.e. 50 years) business cycles overshadowing medium-and short-term cycles; the transition of main sources of energy supplies through the market penetration of coal, oil and gas, and the beginning of atomic energy; and a succession of innovation industries, in particular the railroadization, electrification, the automobile, etc.

### Introduction

#### Gross Domestic Product

A common way of expressing the economic state of a nation and measuring its growth is by estimation of the Gross Domestic Product (representing the expenditures on all goods and services produced in the country including those for exports and excluding imports) or by the concept favored in recent U.S. statistics of the Gross National Product (which measures the output attributed to the factors of production--labor and property--supplied by the residents of the country). See Appendix Table I.1 Population,

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<sup>2</sup>Joseph A.Schumpeter, Business Cycles, op.cit.Vol. I, p.291

Per Capita GDP and Prices in the Developed Countries, 1850-1975  
(Selected Years).

Investments are both a determinant for, and the outcome of the growth of GDP. For this reason, capital formation, and building up of capital stock, depend on the size of the Gross product and its rate of growth. Table I.2 shows the growth rates of per capita GDP in constant prices of a number of presently developed countries (U.K. U.S., Germany/FRG) from the middle of the 19th century to the present. As the system of National Accounts was perfected only in the late 1940's, the historical series evolved mostly from estimates made in retrospect.<sup>3</sup>

To facilitate presentation, and to eliminate annual fluctuations, we compiled the growth rates as averages within five year periods. The only instance where this was not possible for lack of data, was in the case of the U.S., 1869/72 to 1927/31, where the average

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<sup>3</sup> For publications of Historical series of National Accounts, see: F.R.G., Statistisches Bundesamt. Bevölkerung und Wirtschaft 1872-1972, Wiesbaden, 1972.  
Waler G. Hoffmann, Grumbach, Hesse. Das Wachstum der Deutschen Wirtschaft seit der Mitte des 19. Jahrhunderts. Springer Verlag, Berlin, 1965.  
Simon Kuznets: Quantitative Aspects of the Economic Growth of Nations; chapter V. Capital Formation Proportions and VI. Long Term Trends in Capital Formation Proportions in: Economic Development and Cultural Change, Vol. VIII No.4, Part II, July 1960 and Vol. IX, No.4, July 1961.  
B.R.Mitchell with the collaboration of Phyllis Deane. Abstract of British Historical Statistics, Cambridge University Press, 1971.  
B.R.Mitchell: European Historical Statistics 1750-1970. MacMillan Press, Ltd. London, 1975.  
H. Rosowsky, Capital Formation in Japan, 1868-1940. Glencoe Press, New York, 1961.  
U.S. Department of Commerce. Historical Statistics of the United States, Colonial Times to 1970, Washington, D.C. 1975.



growth rates are compiled as from one-five year's period to the next, i.e. from 1867/71 to 1872/76.

The data on Appendix Tables I.1 and I.2 suggest that the road to development was marked by fairly large fluctuations. In fact, the fluctuations, annual and cyclical, become even more evident, if we look at annual growth rates, and investment coefficients, discussed more fully below. The data further suggest that during the long climb towards increased industrialization, G.D.P. total and per capita grew at fairly low rates in the U.K. and Germany. In the U.K. up to World War I, the average annual growth of total GDP was seldom more, often less than 2%; exceptions were two extraordinary growth periods, 1852/56 (3.7%) and 1867/71 (6.5%). The German performance during the pre-World War I period was not much better, except for the two boom periods, 1892/96 (4.5%) and 1902/06 (4.2%). Compared to these two older industrial countries, the growth rates of total GDP in the U.S.A. from 1869/72 to the first World War, were higher and constantly above 3%. In the post World War II period, the picture was reversed, with US average annual GDP growth rates below UK and FRG levels.

#### Historic Growth Rates; UN Projection Targets.

The review of the GDP Growth Rates may be useful as a means of checking on the premises on which to build projections. The United Nations in their recent projections for "the demographic, economic and environmental states of the world", in 1980, 1990 and 2,000 envisages the following targets for GDP growth rates in developed and developing countries:

G.D.P. Growth Rates, UN Targets

	Total		Per Capita	
	Developed	Developing	Developed	Developing
I. =	4.5%	6.0%	3.5%	3.5%
C =	3.6%	6.9%	3.0%	4.9%

I = indicates scenario based on extrapolation to the year 2000 of IDS\* targets for gross product increase in developing countries and extrapolated long-term historical rates in developed countries.

C = indicates scenario based on substantial reduction of gap in gross product per capita between developing and developed countries.

\* = IDS = International Development Strategy

Source: Compiled from UN Future of the World Economy, Preliminary, 1976, p.12.

A comparison of the UN targets with historical observations suggests that the UN rates seem to be reasonable as far as developed countries are concerned. The achievement of the targets set for the developing countries does not seem to be realistic, in the light of the history of the developed countries. Moreover, the developing countries' own performance (especially on a per capita level) during the first and second Development Decades (1960's and 1970's) does not warrant the UN optimism.

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## I. Capital Formation

### 1. Concepts

The compilation of historical series on capital formation was done by working backwards from the most recent statistics of the UN Yearbook of National Accounts (YNA). The advantage of starting out with the UN (instead of national sources) is that data were made internationally comparable by means of a questionnaire of the U.N. Statistical Office. Thus, gross fixed capital formation (GFCF) as used by the UN and in this study, represents for all countries the investments, or annual additions of capital goods in all sectors of the economy, Government, business and residential or households<sup>4</sup>. The capital goods consist of: construction (residential and non-residential buildings); land improvement; transportation equipment (passenger cars and other); machinery and other equipment, and, where appropriate, breeding stock. In principle, all military goods are excluded. For the purpose of this analysis, we have eliminated inventories, although in current systems of National Accounts (SNA) they are considered as capital goods--though not as fixed capital goods.

Current SNA do not include under capital formation any services, thus certain activities are automatically excluded, such as research and development (unless embodied in material capital goods), education, training activities, health services. On the other hand,

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<sup>4</sup>It may be noted that current US capital formation series are frequently limited to "Gross Fixed Private Domestic Investments" which exclude the government sector, or to "Non-residential Gross Fixed Private Investments" which relate to the business sector only.

passenger cars are considered capital goods, and included under capital formation. We made no adjustments for these matters.

In order to get an idea of what among the above defined capital formation may be relevant for our analysis, we could give a quote from S. Kuznets:

"...The capital goods that are clearly carriers of technological change--producers' equipment and the construction that serves public utilities, dams etc.--account for two thirds, at most, of gross domestic capital formation in recent years; and for a smaller proportion in the earlier decades when the share of producers equipment tended to be lower."

[Source S. Kuznets: Population, Capital and Growth. W.N.Norton Co. New York, 1973, p.127]

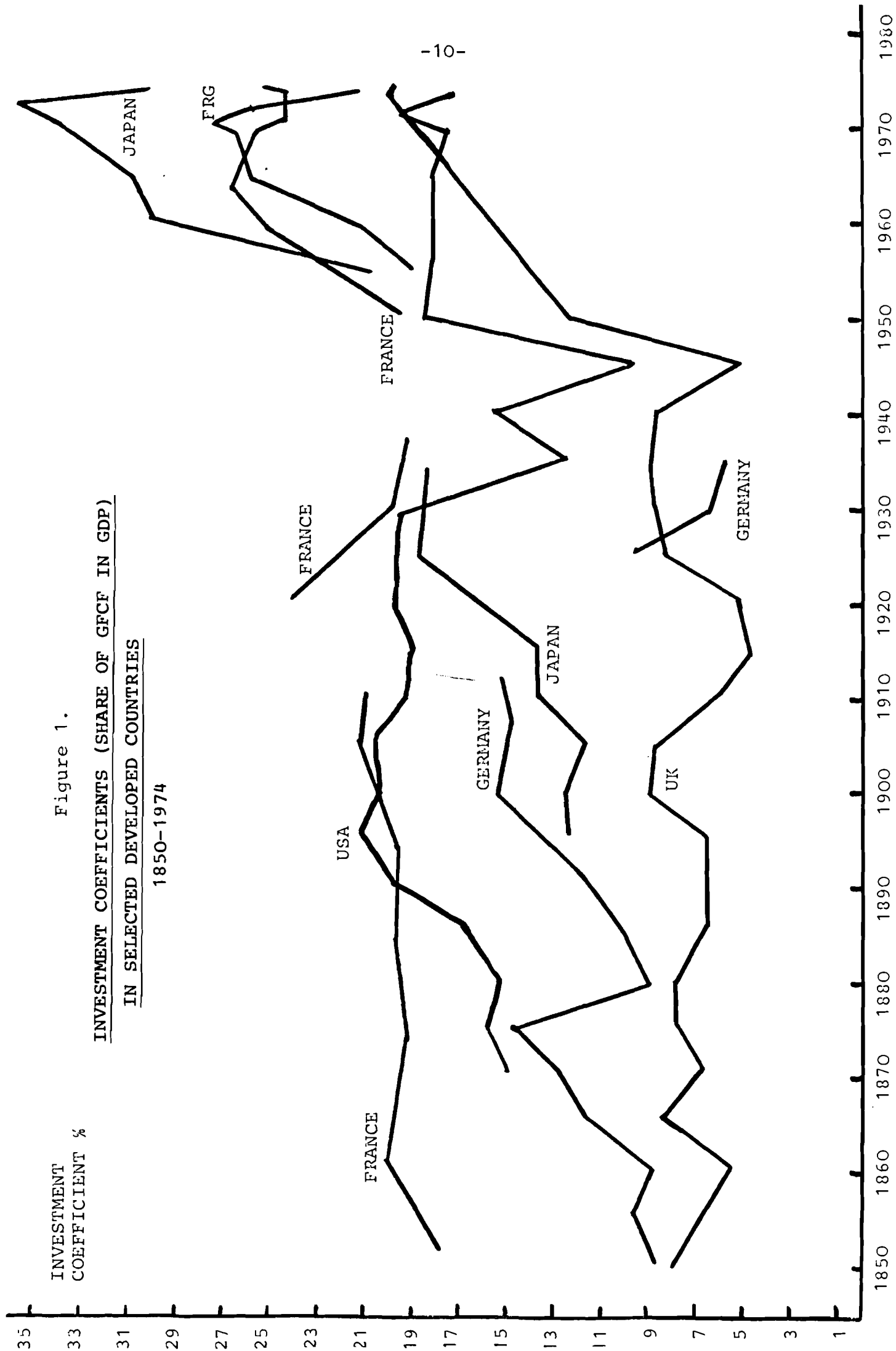
## 2. Investment Coefficients, Developed Countries 1850-1975

For the U.K. the oldest among the industrialized countries, annual capital formation data are available beginning with the year 1830. For Germany, annual data start with the year 1850. French data, for 10 year averages, start with 1789. Japanese capital formation and GNP data go back to 1887/96. For the U.S., capital formation and GDP (later GNP) estimates begin with 1869/73. Because most of the US historical data are available only for 5 year averages, we have presented 5 year averages for other countries as well. (See also our per capita GDP presentation). This has the advantage of eliminating annual fluctuations, besides it renders the presentation more manageable. Certain years, which have a special significance, are shown separately, for example 1912 and 1913 (Germany and U.K.); 1937 and 1938; and 1970 to date.

The origin and sources of the historical series of GDP or GNP, of which capital formation is part, were indicated on page 4 above, footnote 3. Because of the uncertainties involved in the estimates, any interpretation must proceed with a great deal of caution. The investment coefficients were compiled from series in current prices of GFCF and GDP; and while we are fairly certain that GFCF covered generally the same type of capital goods in the various countries, we are less certain as regards the GDP or GNP. For instance, in the statistics we found for France, the "GNP" may be closer to "National Income" (which conceptually is lower than GDP)--and this might explain why our French investment coefficient in the pre-World War I period appear to be at a rather high level. Discomforting as this may be, it is not a deterrent to the observation of the long-term trend; i.e. in France, the stabilization of the investment coefficient in the periods before the First World War, coincided with population stabilization. The attempts to study magnitudes of capital formation in constant prices of a single period and their conversion from national currencies to U.S. dollars, is more hazardous. Unfortunately, we cannot assign margins of error; and this handicap must be considered when making any evaluation of "magnitudes" of capital formation or G.D.P.

Figure 1.

INVESTMENT COEFFICIENTS (SHARE OF GFCF IN GDP)  
IN SELECTED DEVELOPED COUNTRIES  
1850-1974



In the long term developments of each nation we saw that from the mid-19th century on or earlier until 1974, the investment coefficients, except during wars and depressions, continued their upward ways in the U.K., Germany, F.R.G., France, Japan, and for a while the U.S. (See Figure 1, based on Appendix Table I.4). Quite relevant may be the fact that during the earlier, long period of their economic growth, in the 19th century until World War I, the presently developed countries saved at most 20% of their GDP. But during the economic growth period, following the second World War, a relatively short period, the investment coefficients rose more rapidly than ever before in history in France (27.9% of GDP at peak in 1969) F.R.G. (26.7% at 1971 peak), and Japan (34.9% at 1970 peak). [If inventories were included in capital formation, the coefficients would be 29% France, 28% F.R.G. and 40% Japan]. Both the F.R.G. and Japan have relatively low defense budgets.

By contrast to these countries, the U.S. share of Gross Domestic Fixed Capital formation in GNP remained rather constant. Appendix Table I.4 shows that U.S. investment coefficient (total, including government, business, farm and non-farm, and residential investments) stopped growing after 1892/96, when the share of capital formation had reached 21.3%, or about one fifth of GNP. The coefficient has since remained constant (except for the depression of the 1930's) or fallen off slightly. The decrease is so small that some analysts view it as the result of statistical discrepancies. Whichever way one might interpret the long-term US trend (stabilization or slight fall off) it does contrast sharply with the recent trend of the other, presently developed countries. A rather slow move, with changes usually less than one

percentage point, is also seen in the U.S. business sector investment coefficient (see Appendix Table I.4), especially for the past World War II period.

Following are a few observations on investment coefficients in the developed countries, i) mid-19th century to the end of the 1940's); ii) 1950-1975).

i) Mid 19th century to the end of the 1940's:

United Kingdom. Reflecting the country's low level of industrialization, the investment coefficient was below 4% in the early 1830's. In twenty years' time, with progress almost linear (except for a minor setback in 1842/46 that coincided with a period of price decline), the investment coefficient reached 8% in 1847/51. In the nearly 100 years following up to 1942/46, the high point of 1847/51 was surpassed, and this by less than one percentage point, only in a few, short periods: 1862/66 and again 1897/01 and 1902/06. The 1862/66 high level of the investment coefficient coincides or rather reflects a period during which investments in U.K. railroads were at their highest, £ 22.3 million in current prices and 29.4% of all domestic capital formation.<sup>5,6</sup> The high ratio of the domestic capital coefficient 1897/01 and 1902/06 may have been due to a boom in residential construction (over £ 30 million per year) and investments in machinery for domestic use (£ 30.5 - 30.7 million).<sup>5,6</sup>

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<sup>5</sup> See U.K. Domestic Gross Fixed Capital Formation for Residential Construction; mercantile shipbuilding; railways; local authorities' loan expenditures; machinery for domestic use and other for the year 1856-1914 in current and constant prices of 1913 in Abstract of British Historical Statistics, op.cit. p.373/374.

<sup>6</sup> It is interesting to note that during the period 1862/66 gross capital expenditures by the British railroads were at their highest, when, according to Schumpeter the "heroic age of genuine railroad innovation that revolutionized the economic system was entirely over by 1860....and English railroad development from about 1860 on was a consequence of growth in our sense and innovation elsewhere in the system, responding at every step to existing conditions, rather than an active factor of innovation". Schumpeter, op.cit. p.342.



Germany. Investment coefficients becoming available as of mid 19th century, were consistently at a higher level than those of the U.K., except for the one period during the deep depression in 1932/36 when they fell below the U.K. rate. The German investment coefficient which was nearly 9% in 1850/51, rose to a high of 14.6% in 1872/76. This ascent took about 20 years, the progress was straight, except for the decline in 1857/61 (when the U.K. rate also took a dip). The high point of 14.6% reached in 1872/76 was equalled and slightly surpassed in the last years before the outbreak of the first World War (1897/01 to 1913). It was also during that period that the gap between the investment coefficients of Germany and the U.K. widened considerably, as the U.K. coefficient started to decline.

United States. The U.S. data, becoming available with the Kuznets estimates for 1869/73 of gross private and government investment excluding stocks as percent of gross national product were consistently towering over the U.K. and German coefficients, through boom times and depressions, up until the end of the 1940s<sup>6</sup>. The remarkable feature of the U.S. pre-1947 investment coefficient is that the high point of 1892/96 was never reached again. The development from 1892/96 to 1927/31 shows two modest upward moves, 1902/06 and 1917/21; but on the whole, the trend was near stagnation and slowly downward. This trend was to be accentuated in the years following the second World War.

ii) 1950-1975

Characteristic for this period is the fact that among the developed countries, the U.S. investment coefficient is no more

among the highest and the U.K.'s no longer among the lowest. The strongly rising investment coefficients of the European developed countries and Japan, from 1950 to 1973, reflect the re-equipment of industries and the "Wirtschaftswunder" of the post World War II area.

The very latest 1974 and 1975 National Accounts data for Japan and the F.R.G. show a considerable drop in the investment coefficients during the recession. In Japan, the investment coefficient tumbled from its 1970 high of 34.9% to 30.9% in 1975. In the F.R.G. the fall was from a 1971 high of 26.7% to 21.1% in 1975. The U.K.'s investment coefficient continued to rise in 1974, (when it reached 20.0%) with only a very moderate fall off in 1975 (19.8%). A similar movement may have occurred in France, continuous rise of the investment coefficient in 1974, and moderate fall off in 1975 (from 29.8% (?) to 28.9% (?)). The U.S. business investment coefficient fell from a peak of 11.4% in 1973 to 10.5% in 1974 and 9.9% in 1975.

It was relatively easy to see that and why the investment coefficients tended to rise in the European developed countries and Japan, under the impact of reconstruction and innovation industries. It might be more difficult to explain why the U.S. investment coefficients are both at a comparatively low level (i.e. below 20%), and relatively stable. The relatively low level of the investment coefficient may be seen in the fact that in countries where per

capita G.D.P. and annual investments are high in absolute amounts, a fairly high share of the investments go into maintenance. Other countries with comparatively high per capita G.D.P. and relatively low investment coefficients are Sweden and Canada (see also below, cross section analysis on per capita G.D.P. and investment coefficient.)

As regards the levelling off of the U.S. investment coefficient or its tendency to slowly decline, this might be explained by a look at the marginal productivity of investment. In this connection, the reader may be referred to the development of the U.S. capital/output ratios 1950-1970, (Department of Commerce data), or to the F.R.G. 1950-1970 capital/output ratios, discussed in section III. of this paper.

### 3. Per capita G.D.P., Economic Activity and Investment Coefficient Cross Section Analysis.

Generally, the long-term developments show that the investment coefficients tended to rise, at least for a while, as per capita G.D.P. increased and the role of agriculture decreased in the nation's economies. The assumption that the investment coefficient is largely, though not exclusively, determined by the level of income and economic activity was tested in a cross section analysis encompassing 80 countries ranked in decreasing order of their 1970 per capita G.D.P. in U.S. Dollars. The analysis relates

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to market economies only, in 1960 and 1970.<sup>1</sup> The ranking of the countries may invite some criticism, because of the inadequacy of official exchange rates used for converting G.D.P. from national currencies to U.S. dollars. A study by the U.N. and the World Bank attempted to compile an "ideal exchange rate" based on price indices for goods according to the weight they held within the respective countries and the U.S. in 1970. The data reveal considerable undervaluation for the U.K., Japan and F.R.G., and overvaluation for France, when official exchange rates are used instead of the "ideal exchange rates".<sup>2</sup>

While the ranking of the individual countries might be distorted by official exchange rates, its use seems still to be adequate for the distribution of countries into broad groups as used for the study: 1. 1970 per capita G.D.P. \$1,700 and more; 2. 1970 per capita G.D.P. \$250 to 1,100; and 3. 1970 per capita G.D.P. below \$ 250. No example was found for 1970 per capita GDP between \$1,150 and \$1,700.

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<sup>1</sup>The data were compiled from the UN Yearbook of National Accounts Statistics, Vol.III, 1973 (latest available at IIASA). The UN source gives per capita GDP expressed in US \$ and percentage share of GFCF in GDP for market economies only (see UN, op.cit., Tables IA and IIA). Per capita product of centrally planned economies are not converted to dollars. Data on net fixed capital formation as percent of net material product, for Bulgaria, Cuba, Czechoslovakia, German Dem. Rep., Hungary, Poland, USSR and Yugoslavia are shown in the UN Yearbook, op.cit. Table 2B.

<sup>2</sup>See Irving B. Kravis, Z. Kennessy et al. A System of International Comparisons of Gross Product and Purchasing Power. Johns Hopkins University Press, Baltimore 1975; Tables 1.1 and 1.3, pages 6 and 8.

i) Per capita G.D.P. and kind of economic activity.

Because of the paucity of the data, it is best to limit the economic activity groups to "agriculture, forestry and fishery", and "industry". Data for the individual countries falling under each per capita G.D.P. class may be seen on Appendix Table I.7.

a. Per capita G.D.P. \$1700 and more.

In this group, the share of agriculture is very low; in most countries it amounts to no more than 3 to 6 percent of G.D.P.

The industry sector is the source of about 30 percent of G.D.P. in the rich countries. Exceptions are due to special circumstances. For instance, the fact that in the FRG 46% of GDP come from industry may have something to do with the partition of Germany, as more of the industrialized areas became part of the FRG. The fact that Japan's industry sector is the source of nearly 40% of its GDP may be an indication of that country's intent drive for industrialization, especially in the manufacturing sector (36%)--and a certain lack of underdevelopment of services. In some of the super-rich countries the share of services in G.D.P. is relatively small; in others (US, UK, Sweden) it is fairly high--and these are the countries with a relatively low investment coefficient.

b. Countries with 1970 per capita GDP between \$1,100 and \$250.

In this group of countries, one could roughly say that 20-30% of G.D.P. derives from agriculture. Countries where agriculture accounts for much less are those with a pronounced mining for export sector; i.e. Saudi-Arabia, Venezuela, Iran, Iraq, Chile, South Africa.

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<sup>3</sup>Data for the percentage distribution of G.D.P. by kind of economic activity are given in the UN Yearbook of National Accounts Statistics, Vol. III. (op.cit.) Table 3. These data are based on estimates of G.D.P. in current prices. As stated by the UN (Yearbook, op.cit., p.94, general note to table 3), the estimates are not fully comparable from country to country in coverage and classification used. In addition, for some countries, the components can not be adequately estimated for lack of information on import duties. For these reasons, we have eliminated from our sample those countries whose statistics did not seem plausible, i.e. where components added up to only 80% of total, or where we found gross inconsistencies. This explains why only 63 countries are included in the analysis.

c) Countries with per capita GDP of less than \$250,--.

In this group of countries, more than 30% of GDP derives from agriculture. Exceptions are those countries that have a pronounced mining export sector, namely Bolivia (agriculture = 16% of GDP), also Zaire (agriculture = 26% of GDP). But generally it is observed that the low level of development is reflected in the high proportion of agriculture in GDP. In fact, at the bottom of the scale, or hard core underdeveloped countries, the agricultural sector accounts for about 50% of GDP, for example in Uganda (49%), Malawi (51%), Ethiopia (51%), Burundi (52%).

The conclusions to be drawn from the above analysis for the capital formation study is that the investment coefficients tend to be low in countries where a high proportion of GDP originates from the agricultural sector. As the structure of any country tends to move slowly, the implication of the above stated conclusion is that there are powerful constraints that should not be overlooked when estimating the developing countries' capacity to absorb major increases in capital and energy consumption.

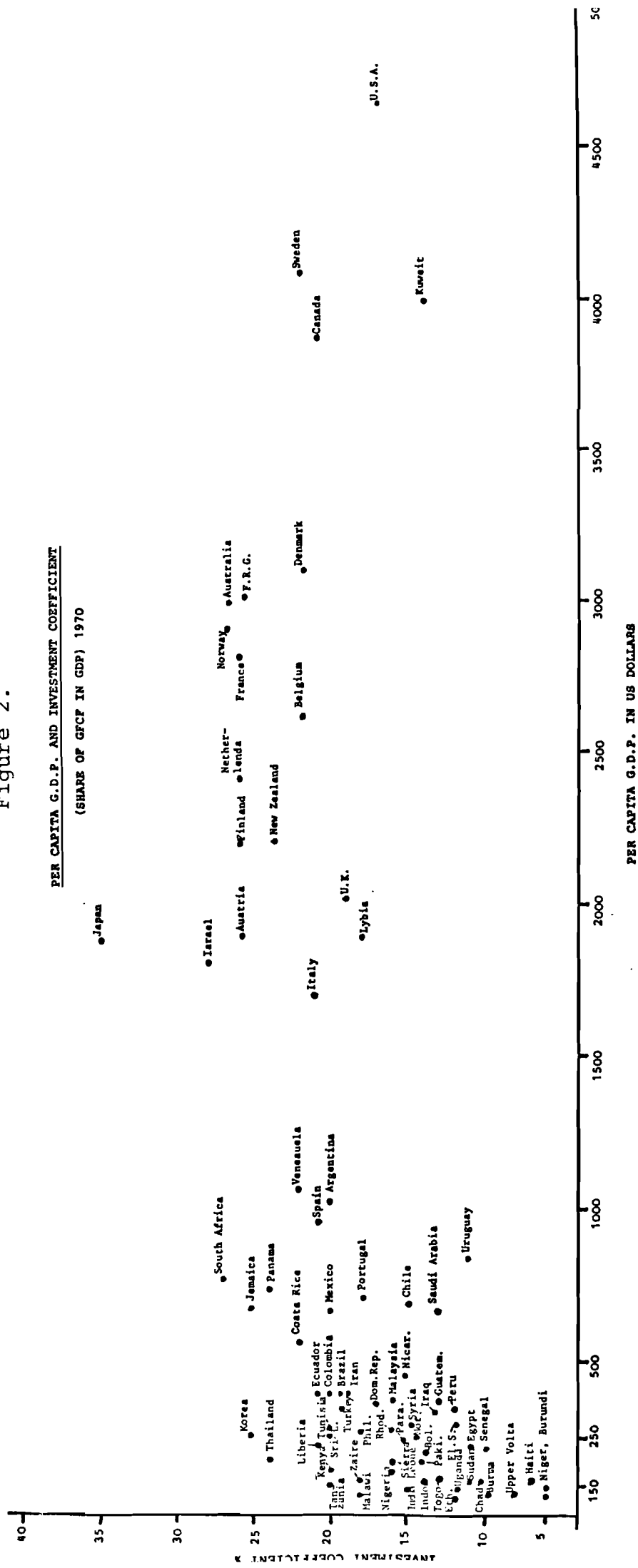
ii) Per Capita G.D.P and investment coefficients

The individual countries that fall into the three per capita G.D.P. classes and the investment coefficients typical for these classes are shown on Appendix Table I.8. The 1970 data are plotted on a graph (see figure 2); on the left side of the graph are most of the developing countries, poor and with low investment coefficients; the cluster of countries is thinned out towards the right side of the graph, where higher per capita G.D.P. and higher investment coefficients prevail.

a) 1970 per capita G.D.P. of \$1,700 and more.

The share of capital formation ranges mostly between 20 and 27% of G.D.P. Exceptions on the high side are Japan (35% in 1970) and, not shown on the table, Switzerland (28% in 1970). Exceptions at the bottom of the scale are the U.K. (18%) and the U.S. (17%). The low investment coefficient of the U.S. is matched and topped

Figure 2.



only by rich, but not developed countries, i.e. Kuwait (14%); also Libya (18%).

With the exception of Japan and France, the investment coefficient hardly changed between 1960 and 1970. Examples are the U.S., where the coefficient remained constant (17%), or dropped slightly as in Canada (22% in 1960 and 21% in 1970) or increased slightly as in Sweden (21% in 1960 and 22% in 1970). The little fall in Canada's investment coefficient was accomplished by a fall in its rank among the super rich below Sweden, while Sweden's little increase in its investment ratio moved her up the ladder of per capita G.D.P. to second after the US in 1970 (and, as stated above, atop the US in more recent years).

The shifts in rank among the super rich and rich may not be so important--especially since data are not adjusted for inflation. What is important is the fact that a relatively low and levelling off investment coefficient coincides with a slower growth of per capita G.D.P.

b) Middle level, 1970 per capita G.D.P. between \$1,100 and \$250.

The share of capital formation in G.D.P. varies widely among these countries, but generally one could state that the normal share of capital formation would be between 16 and 22% of G.D.P. For example, 22%--Venezuela, Costa Rica; 21%--Spain; 20%--Argentina, Mexico, Colombia, Ecuador, Tunesia; 19%--Brazil, Iran, Turkey, Honduras, Liberia; 18%--Portugal, Philippines. Exceptions in the case of countries that show a higher or lower share of capital formation can be explained in most cases as being due to special circumstances. For instance, the fact that South Africa shows a 1970 per capita GDP of only \$773 and a capital formation ratio as high as 27%, is a reflection of certain developments in the country.



The fairly high ratio of Panama, 24% in 1970, it continued to rise to 30% in 1972, may be due to certain activities in the Canal zone. Jamaica's high ratio of 25% in 1970, marking the height of the investment boom for tourist trade expansion, has dropped subsequently to 23% in 1972.

c) Low level, 1970 per capita G.D.P. of less than \$250.

In this group of countries the 1970 share of capital formation is hardly ever more than 15% of G.D.P., as for example in India (15%), Pakistan, Indonesia (14%)--to mention just the largest countries in this block. The exceptions shown by some countries, could be explained as follows: Thailand's fairly high share of capital formation (24% of G.D.P.) seems to reflect certain special features of Thailand's economy that may have been connected with the Vietnam war.

Apart from these exceptions, the general tendency in this group of low per capita GDP is "the lower the GDP per capita the lower the investment coefficient". It is therefore no accident that countries with lowest per capita GDP have also the lowest investment coefficients, i.e. 11% (Sudan, Chad), 10% (Burma), 8% (Upper Volta), 7% (Haiti), 6% (Burundi).

The findings, with all due reservations, could be summarized as follows:

Investment Coefficient and Share of Agriculture in GDP,  
by size of per capita G.D.P. in 1970

Per Capita G.D.P.	Share of Agriculture in G.D.P.	Investment Coefficient
\$ 1,700 and more	less than 10%	20% and more
\$ 250 to \$ 1,100	10-20%	15-20%
below \$ 250	25-50%	below 15%

Generally, the cross section analysis showed that there seems to be a very direct relationship between low per capita G.D.P., dominance of agriculture as main subsistence source, and very low investment coefficient in the groups of very poor, so-called "hard core" underdeveloped countries.

The relationship ceases to be less direct among countries that have reached higher levels of development. There, the capability for capital formation is affected by a number of other factors besides rising per capita G.D.P. They include population growth, resource endowment, foreign trade, distribution of income and wealth, and other elements that are hard to quantify, i.e. stage of development or investment absorption capabilities, Governments' fiscal and development policies, social innovations, and R&D, and confidence in countries' economies and politics, etc.

Among the rich and super-rich, the sheer fact that per capita G.D.P. has reached high levels in absolute amounts may by itself be a factor causing the investment coefficient to level off (i.e. Sweden, Canada, U.S.) in view of the high requirements for maintenance.

#### 4. Prices, Interest Rates, Population, 1850-1975

##### 4.1 Prices (GFCF deflators)

##### i) Concepts

One reason for the compilation of the long term price index numbers is to study the relationship between price movements and the development of the investment coefficient. Another purpose served is the conversion into constant prices of absolute amounts of per capita capital formation and capital stock.

In most cases, the deflators are implicit in the national accounts data, showing G.D.P. and GFCF in current and constant prices.<sup>1</sup>

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<sup>1</sup>For the pre-World War I period, GFCF and GDP deflators are mostly identical.

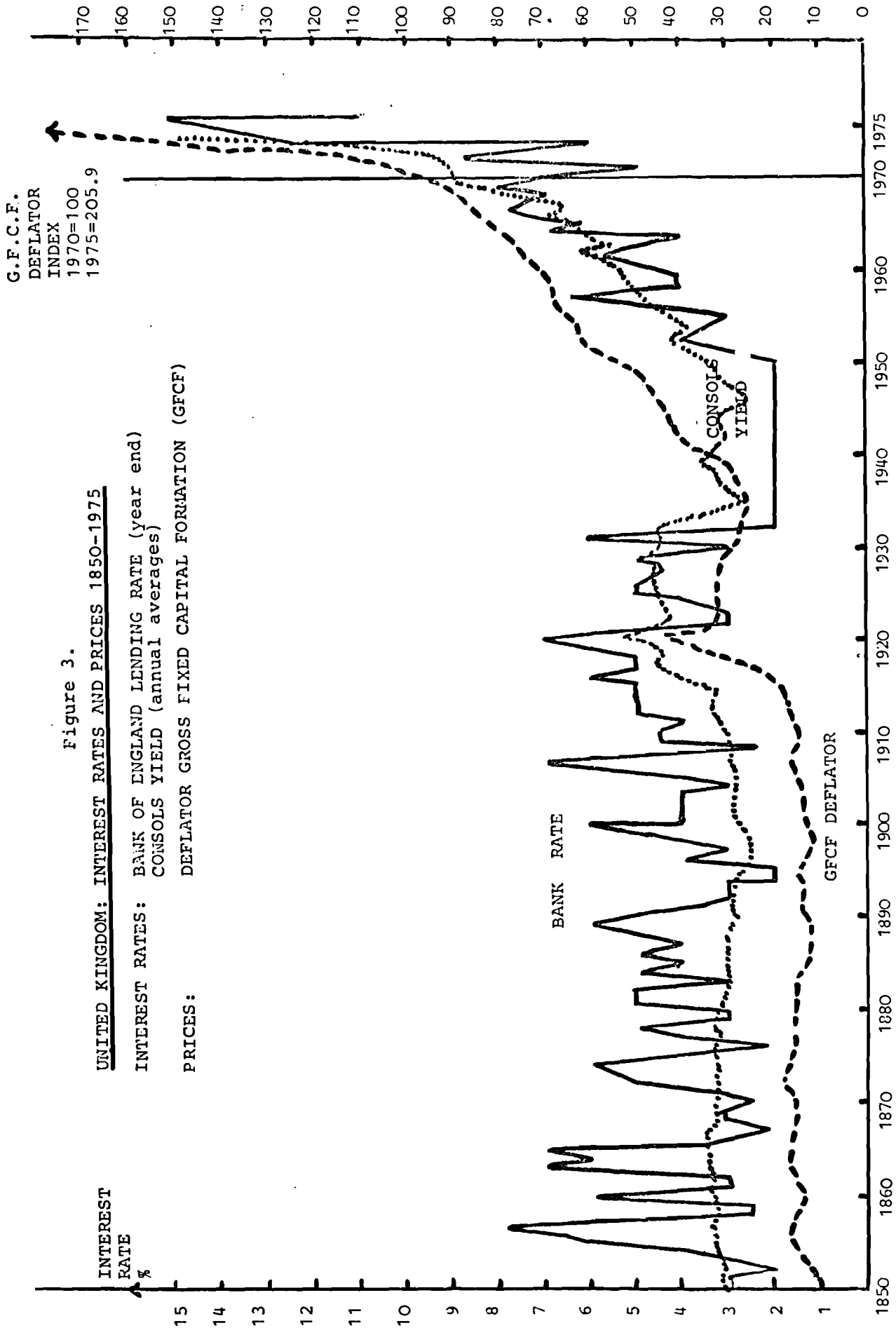
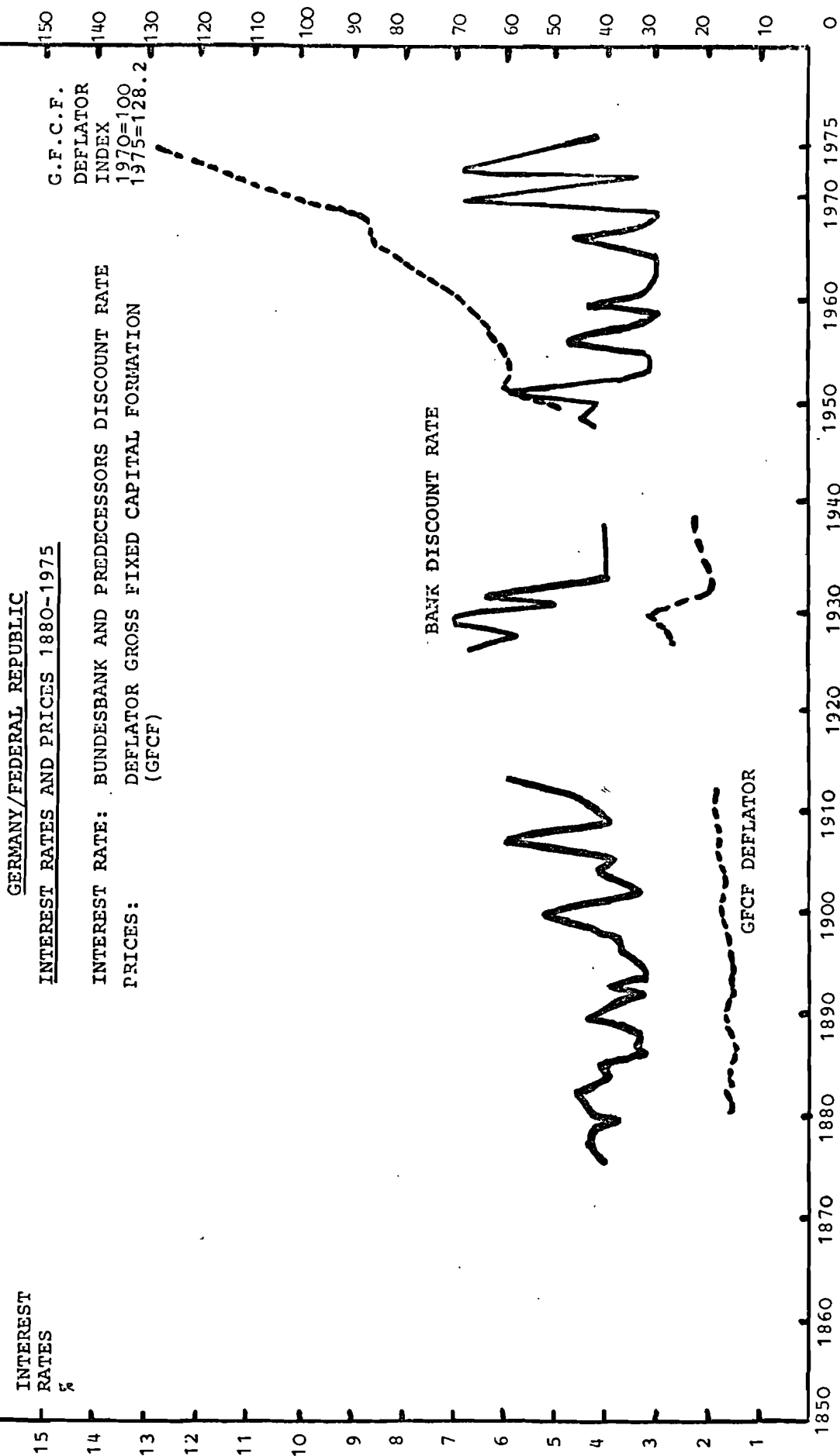
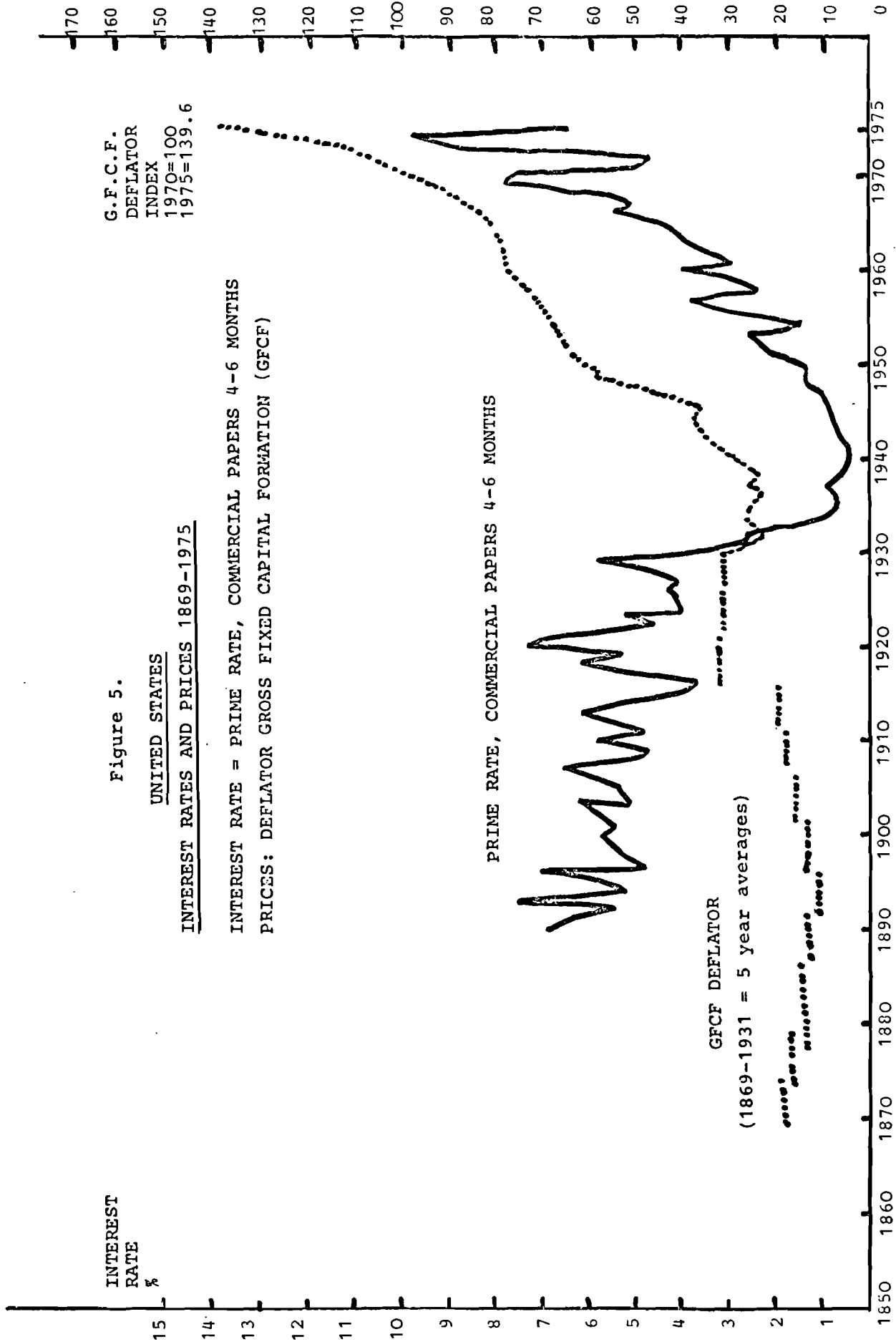


Figure 4.





The compilation method for our long-term price index numbers consisted in shifting the base years of the deflators, if and when the series were overlapping and in linking the price indexes of various periods. For example, the U.K. National Accounts data 1850 to 1913 are given by the source in prices of 1900; next we have National Accounts data 1913 to 1947 in prices of 1938, etc. The German national accounts data 1850 to 1913 are given in 1913 prices, and the data 1913 to 1938 in 1938 prices, etc. The U.S. used 1929 prices for the historic series 1867/73 to 1947; the basis for the series 1929 to 1974 is 1958; and finally (for capital stock) we have series 1925 to 1975 in terms of 1972 prices. Each price series is based on a different basket of goods; therefore the fact that our GFCF deflators cover a century long period does not mean that they are based on a single basket of goods which had never changed over the entire period. A problem arose only in the case of implicit deflators when the time series did not overlap and when a link had to be found between two price series. How this was done in the cases of the F.R.G., U.K. and France, is indicated in Appendix VI, Note on compilation of Long Term GFCF Deflators.

ii) International comparisons.

Our price indicators show considerable agreement as to the trend in the various countries. For the years 1850 till the outbreak of World War I the prices reflect the long term business cycles or waves suggested by Kondratieff<sup>2</sup>. The data on Appendix Table I.5 show prices at a peak in the late 1860's in the U.S.A. (Civil War); 1872-76 in the U.K. and Germany (after Franco-Prussian War). French deflators peaked during the decade 1865-74. This is followed in all four countries by a fall lasting about 20 years and reaching its lowest point in 1892-96. Then comes a slow climb up, taking almost another 20 years, and by the outbreak of World War I the deflators are

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<sup>2</sup>The long term cycles or waves suggested by Kondratieff: 1780/90 to 1844/51; with a peak in 1810/17; second wave from 1844/51 to 1890/96; with a peak in 1870/75; and a rise from 1890/96 to 1914/20 after which "probably" came a decline. (Source: International Encyclopedia of the Social Sciences, Vol. 7-8, p.443) Kondratieff is frequently quoted in A. Schumpeter Business Cycles, New York, 1939.

about back to where they stood around the turn of the 1870's. Only the French deflator index, with 1905/13=100, had not regained the earlier peaks of 1855/64 and 1865/74 when it stood at 127 and 125. (French historic data are available for 10 year periods only). However, while the late 19th and early 20th century may have been periods of generally falling deflators for France, things changed radically with later instability of the Franc.

Next our deflators show the depression (US, UK, Germany with incomplete data also France), and the subsequent recovery in the U.S. and U.K.

Post World War II period.

At the threshold of the 1950's an unprecedented growth period was ushered in. Unfortunately, prices also rose. As indicated above, we have linked the pre-World War I deflators to those of the post World War II area. A comparison of these deflators shows surprising similarity for the FRG, U.K. and U.S. especially in 1952/56. Prices and deflators have risen since, with the U.K. having outpaced both the U.S.A. and F.R.G. Remarkably, both F.R.G. and U.S.A. were in 1974 at almost identical levels vis a vis their 1913, respectively 1912/16 averages.

#### Post World War II GFCF Deflators

	Index Numbers, 1913=100		
	F.R.G.	U.K.	U.S.
1913	100	100	100 <sup>a)</sup>
1952-56	314.0	373.7	350.8
1967-71	473	558	505
1970	528	584	526
1971	566	635	557
1972	590	695	574
1973 <sup>P</sup>	617	807 <sup>P</sup>	606
1974 <sup>P</sup>	658	970 <sup>P</sup>	657
1975	677	1203	734

p= preliminary data.

a= 1912/16

- iii) Comparison of the movements of prices and investment coefficients.

If one were to plot a graph of the GFCF deflators (Appendix Table I.5 ) and the investment coefficients (Appendix Table I.4) one could easily see in each country how the investment coefficients tend to rise and fall with increasing and decreasing prices, except for World Wars and times of runaway inflation. Thus it seems that the biggest incentive for capital formation are the periods of modest price increases that go with, or lead real economic growth.

#### 4.2 Interest rates

The observations on capital formation would be incomplete if there was no reference to the income on capital, or interest and profits. While considerable light is shed on the profits of U.S. corporations 1948 to 1973, in the study by W.D.Nordhaus "The Falling Share of Profits"<sup>1</sup>, there are no long term and internationally comparable data that we found readily available. The following observations are therefore limited to the long term development of interest rates and bond yields in the U.K. and Germany/F.R.G. since about 1850 and the U.S. prime rate since 1890.

#### Concepts, Sources

The compilation of "interest rates and bond yields" may be justified on the basis of a quote from Schumpeter, as "average of interest rates and bond yields" serve as index of business activity<sup>2</sup>.

Historic statistics of the lending rate charged by the Bank of England start with 1797, giving the year, month and day of changes.<sup>3</sup>

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<sup>1</sup>W.D.Nordhaus "The Falling Share of Profits" in Brookings Papers on Economic Activity 1/1974, p.169-217.

<sup>2</sup>Joseph A. Schumpeter. Business Cycles Vol.I. McGraw Hill, New York, 1939, p.23, footnote 1.

<sup>3</sup>See B.R.Mitchell and Phyllis Deane. Abstract of British Historical Statistics. Cambridge University Press 1971. Monograph 17 and U.K. Annual Abstract of Statistics, 1975. International Monetary Fund (IMF), International Financial Statistics (Monthly).



In order to simplify compilation and presentation, we show the rates as of mid and end of the year (see Appendix Table I.11). Long time series exist also for U.K. Government securities; these are the "yield on consols" (Consolidated Government Obligations shown annually since 1796 in the U.K. statistics<sup>4</sup>). (See Appendix Table I.9)

For Germany readily available historical series on interest rates for government obligations (at communal level) exist for the pre World War I period, 1850-1913<sup>5</sup>. (Appendix Table I.10). The German Central bank's rate or the "Bank Diskont Satz" of the Reichsbank, and subsequently the Bundesbank go back to 1870 (Appendix Table I.11). For 1870 to 1971, the rates are given in terms of annual averages<sup>6</sup>; they were updated by compilations from current publications on changes in the "Diskont" of the Bundesbank<sup>6a</sup>. Data on the diskont of the Bundesbank at end of the month, are also published by the International Monetary Fund (IMF)<sup>6b</sup>.

For the U.S.A. an indicator of historical interest rates are the series, starting with 1890 on the "Prime rate on commercial papers for 4-6 months"; this is the interest charged by commercial banks to their prime customers<sup>7</sup> (see appendix Table I.11).

The bank rates and the "prime rates", while not typical for all lending and borrowing transactions, may be considered as minimum lending rates (for most of the periods under consideration). Moreover, they indicate the trend of the nation's interest rates.

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<sup>4</sup> See Yield on Consols, 1756-1956 in B.R. Mitchell and Deane, op.cit., p.455; see also U.K. Annual Abstracts of Statistics, 1975, p.391. Note that in the UN statistical publications, the "Consols" appear as Treasury Bills, i.e. UN Statistical Yearbook, 1975

<sup>5</sup> See Die Verzinsung der Öffentlichen Schulden in W.G.Hoffmann, Grumbach Hesse. Das Wachstum der Deutschen Wirtschaft seit der Mitte des 19. Jahrhunderts, op.cit. p.798.

<sup>6</sup> See "Diskont und Geldmarktsätze" in Bevölkerung und Wirtschaft 1872-1970 published by the Statistische Bundesamt, Wiesbaden 19.. p.215.

<sup>7</sup> See the Prime rate, on an annual basis, in "Money Market Rates: 1890-1970" in Historical Statistics of the U.S. Colonial Times to 1970, U.S. Government Printing Office...p.1001, Updated in the U.S. Statistical Abstract, and Survey of Current Business.

<sup>6a</sup> See Deutsche Bundesbank. Monatsberichte.

<sup>6b</sup> See International Monetary Fund (IMF) International Financial Statistics (Monthly).

Observations ; Interest rates and GFC deflators.

These tendencies become quite evident with the developments starting about 1900: In the U.K., Germany and U.S.A. the rise in bank and prime rates 1900 to 1929, was paralleled by rising GFCF deflators. The fall in prices, set off by the 1929 crash was accompanied by a steep descent of the U.S. prime rate from 5.85% in 1929 (already below a previous peak of 7.50% in 1921) to the all time low of 0.53% reached in 1941. In the U.K. the bank rate fell from 6 1/2% in September 1929 (that was below a previous peak of 7% on 15 April 1920, and still below the previous all time records of 10% reached on 1 August 1914; 12 May 1866 and 9 November 1857) to a depression level of 2% - which remained in effect throughout World War II until 1950. In Germany, the bank discount fell in 1929 from 7.11% (previous peak 9.15% in 1925) to a low of 4% in 1933, remaining at this level with only little change through 1950, when the annual discount rate stood at 4.36%. Based on these data one could say that all 3 countries (U.K., F.R.G. and U.S.A.) entered the 1950ies with bank, respectively prime rates, that hovered around depression levels of the 1930ies.

By contrast to the bank and prime rates, the price indicators, i.e. deflators of gross fixed capital formation, stood in all 3 countries by 1950 well above their 1929 levels. During the following, unprecedented growth period of G.D.P. and capital formation, prices and interest rates rose sharply. The increase was the steepest in the U.K. with the index of GFCF deflators reaching 206 in 1975 (1970=100) and the bank rate set at 15% on 6 October 1976. The inflation, measured in terms of GFCF deflators with 1970=100 was "milder" in the U.S. (1975=139.6) and FRG (1975=128.2); this was accompanied in the U.S. by a prime rate climbing to an all time

record of 9.87% in 1974 (it has since come down to 6.32% in 1975 and an estimated 5.5% in 1976). In the F.R.G. the bank discount rate peaked at 7% in 1973 fell to 6% in 1974 and stabilized at 3.5% in 1975 and 1976.

A comparison of inflation and interest rates with capital formation, measured in terms of the investment coefficient, shows these data for the recent recession:

Germany: In 1974 and 1975, inflation continued though less intensely than in the U.S. or U.K. and both the bank discount rate and the investment coefficients dropped, rather steeply. In 1976, inflation continued, the bank discount rate remained at its low level.

U.S.A.: In 1974 and 1975, inflation continued at a higher rate than in the FRG, the prime rate at first continued to climb (1974) but dropped in 1975 and 1976; the investment coefficient decreased in 1974 and 1975.

United Kingdom: In 1974 and 1975, inflation was higher than in the U.S. or FRG; the bank rate fell in 1974 and 1975, but rose sharply. The investment coefficient continued to rise in 1974 and fell off slightly in 1975 to a record level of 15% at the height of the sterling crisis in October 1976. It has since decreased and on 10 March the minimum lending rate (MLR) of the Bank of England was reduced by 1% to 11%, "responding to brighter financial prospects for Britain and falling money-market interest rates".

#### 4.3 Population Growth

The population growth is not seen as natural growth alone. Instead, the data reflect the changes caused also by migrations and territorial changes.

The outstanding feature of the population growth trends shown on Appendix Table I.6 is the strong, and uninterrupted increase of U.S. population. For the pre-World War I period the index numbers show that by the middle of the 19th century, both Germany and the U.K. had already reached over 50% of their 1913 level, while the U.S. had barely reached 30% of its 1912-16 level. In the late 1930's, Germany (frontiers as of the time) had just come back to the 1913 number of the old empire; the U.K. had surpassed its 1913 level by a good 10%, and in the U.S. a good 30% more people were living than in 1912-16.

In the post World War II period we see that by 1975, the F.R.G. population was still nearly 10% below the empire level of 1913, while the U.K. population had grown to 30% above 1913, and the U.S. had more than doubled its population compared to 1912/16.

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5. Observations on what made capital formation grow.

1. Prices.

Capital formation is part of GDP, and it grows when GDP grows and the investment coefficient rises, remains constant, or at least does not fall below a certain level. As our tables indicated, prices seem to have exerted a direct influence on capital formation. Investment coefficients, and per capita capital formation in constant prices rose with rising prices, except for world wars and times of runaway inflation. By the same token, when prices fall, investment coefficients decrease, and per capita capital formation drops. This was shown during the deep depression in Germany and the U.S. On an annual basis, we have such examples as for instance the U.S. recession of 1937, etc.

2. Population, technology.

While prices were important indicators for the growth of per capita capital formation in the past, it seems that for a look into the future we had better study the role of population and technology, and possibly the finite supply of natural resources. As to the role of population in economic growth and hence capital formation, some clarification is called for. This is found, for instance, in the selected essays by Simon Kuznets on Population, Capital and Growth.

In the first place, he finds that the association between the growth of per capita product and population is rather loose. As we have seen on our tables and graphs, high rates of growth of per capita capital formation does not necessarily mean high rates of growth of population (i.e. F.R.G. and U.S. in the post World War II period).

The present situation in the developed countries is quite different from what they experienced earlier in their history--when rising knowledge and technology permitted greater control over health and production, leading to an accelerated growth of both population and per capita product. "But today and in areas with conditions quite different from those that characterize the presently developed countries in their past, rapid population growth may be an obstacle to, rather than a condition of, an adequate rise in per capita product" (S. Kuznets: Population, Capital and Growth, op.cit. p.3). The author then asks why is it that (in our times) "a larger number of human being need result in a lower rate of increase in per capita product? More population means more creators and producers,... why should not the larger numbers achieve what the smaller numbers accomplished in the modern past--raise total output to provide not only for the current population increase but also for a rapidly rising supply per capita?" (Kuznets, op.cit. p.3). The answer may be found in capital requirements. "Larger population and labor force mean....additional workers who must be equipped with material capital if their productivity is not to fall below that of those already equipped and engaged. Hence.....the higher the rate of increase in population and labor force, the greater the requirement for material capital to equip the additional workers" (Kuznets, op.cit. p.10). The numerical example for this theory and the illustrative calculation on "effects of rise in rate of population growth on capital requirements and per capita consumption" are given in Kuznets, op.cit. p.10-18.

## II. Capital Stock

### 1. History, Concepts, Evaluation

#### 1.1 History

Formerly capital stock estimates were part of the system of National Wealth statistics. In the late 1950s it was found that the methods to estimate national wealth varied more from country to country than the systems of National Accounts, or the methods of measuring income flows, of which capital formation is a part. For this reason comparisons between countries and over time were even more hazardous for capital stock than for capital formation.<sup>1</sup> We therefore eliminated historical capital stock data for a number of countries, shown in the Income and Wealth series (except for the U.S. series that were taken over by the Commerce Department). With infinitely better data becoming available from modern industrial censuses, and the subsequent development of input output matrices, computerization of census processing, and the development of the perpetual inventory method, capital stock estimates went through a renaissance. The estimates became based on the gross fixed investment flows that are part of the National Accounts Systems. This yielded for the more recent periods of history, 1950-1974, estimates of total gross capital stock, i.e. for the U.S., F.R.G. and the U.K. that seem to be more reliable.<sup>2</sup>

In our presentation we shall first deal with the period

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<sup>1</sup>The uncertainties involved in national wealth and capital stock estimates were stated as follows:

"Inter-country comparisons of economic structure derived from the estimates of national wealth, and from the relationships between capital assets and current output, necessarily present many problems. Even when the theoretical concepts and categories, and the methods of estimation, appear to be identical, the resulting estimates may still fail to yield precisely comparable results between one country and another. Differences in valuation methods, in relative prices and in the nature of the basic statistics used can be responsible for wide differences in the resulting estimates--probably even wider differences than those involved in national income estimates."

Source: R.W. Goldsmith et al. The Measurement of National Wealth in Income and Wealth Series VIII, Bowes and Bowes Publishers Ltd., 1959, p.1.

<sup>2</sup>Better capital stock data may also have been compiled for other countries; we did not include them into our paper, because they are presently not available at IIASA.

1850-1974, showing total capital stock (structures and equipment) by sectors of the economy, and per capita capital stock in constant prices, in Germany, F.R.G., and the United States. This will be followed by an analysis of the capital stock (business capital in the U.S.) by more narrowly defined activities for the F.R.G., U.S.A. and U.K., plus a distribution of world capital stock by regions.

## 1.2 Concepts

The data on total capital stock are concerned with "domestic, reproducible, tangible, fixed assets". This includes: Structures (building) and equipment (durable goods) held by the private sector (business and household) and government except military goods. By this definition, the "capital stock" data exclude: land (except for improvements) and natural resources; patents and licenses or works of art (which are considered "Intangibles"); financial claims on other countries; and military goods. The data on business capital stock are limited to the private sector including agriculture, mining, manufacturing, construction, energy sector and services, and excluding government and households.

The relative importance of structures and equipment in the U.S. and German capital stock data may be seen from the estimates for 1960:

1960 Total Capital Stock (all sectors of the economy)				
USA (1958 prices)			FRG (Brutto, 1962 prices)	
	Billions \$	%	Billions D-Mark	%
Structures	892.9	71.4	759	72.5
Equipment			288	27.5
Producer Durables	218.6	17.4	.	.
Consumer	" 139.6	11.2	.	.
Total	1251.1	100.0	1047	100.0

Source: Compiled from U.S. Statistical Abstract 1975, p.411, table 674 and F.R.G. 1975 Statistisches Jahrbuch, p.21, table 26.18.



Inventories are excluded from our capital stock data, although they are part of the reproducible, tangible assets. Inventories, which include livestock and, in some instances, "standing timber", may not be unimportant for the capital/output ratios of the farm sector. However, we attempted to exclude inventories because they were excluded from the capital stock FRG 1950-1970, compiled by H. Lützel (see Wirtschaft und Statistik, 1971/10), that are continued in the F.R.G. Statistische Jahrbuch 1975. It was not possible, however, to exclude inventories from the German historical series.

### 1.3 Perpetual inventory method, Gross and Net Capital Stock

The U.S. Department of Commerce estimates of gross capital stock, "are derived by the perpetual inventory method, which starts with investment flows and calculates gross capital stock for any given year by cumulating past investment flows and deducting discards".<sup>1</sup> The discards, or retirements of assets, are based on assumptions of average service lives.<sup>2</sup>

Likewise the F.R.G. gross capital stock [Brutto Anlage Vermögen] is estimated from cumulative additions [Zugänge] minus retirements [Abgänge] which are goods effectively leaving the process of production. This concept involves only actual retirements, without consideration of depreciations.<sup>3</sup>

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<sup>1</sup> Survey of Current Business, April 1976, Vol.56, No.4, p.47

<sup>2</sup> For details on these assumptions and sources, see "Survey of Current Business, April 1976, op.cit.

<sup>3</sup> F.R.G. Statistisches Jahrbuch, 1976, p.596.

Cumulation of past net investment flows (Gross investment minus depreciation) yields net capital stock. "The value of net capital stocks" equals the difference between the cumulative value of gross investment and cumulative depreciation. The methods of depreciation used for U.S. compilations of net capital stock is usually the straight-line formula, which assumes equal dollar depreciation each year over the life of the asset".<sup>2</sup>

Price basis for computation of Capital Stock.

As stated in the Survey of Current Business: "...capital stock measures are computed on three bases of valuation--historical cost, constant cost, and current cost. Historical cost measures are derived by valuing each item in the stock at the price at which it was purchased new...".

"Constant cost measures are derived by valuing all assets at the prices of a given period. For these calculations, the gross investment flows must be expressed in constant prices. This is done by applying appropriate price indexes to the current-dollar investment flows. The constant cost stock is a measure of the physical volume of capital."

Current cost measures are derived by valuing all assets in the stock at any specific period at the prices of that period. This is done by applying price indices to the constant cost stock estimates to convert them to current cost measures. In effect, the current cost stock is a measure of the replacement value of capital."<sup>4</sup>

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<sup>3</sup>Survey of Current Business, op.cit.

<sup>4</sup>Survey of Current Business,

Evaluation of the estimates.

For an evaluation of the capital stock data presented below, one needs to keep in mind that these can only be approximations because the application of the perpetual inventory method (though preferable to the "Balance Sheet Method") requires:

Long-term series of capital expenditures, capital goods deflators, and estimates of the length of life of capital goods. All 3 elements, but especially long term price series and life time estimates of capital goods involve considerable statistical uncertainties. Moreover, the quality of the world estimates is affected by the conversion of data from national currencies to U.S. dollars, not to mention the difficulties that evolve from differences in national structures of the economy.

Another, minor source of discrepancies between various estimates is whether they relate to the beginning, end or middle of the years under consideration.

In the following, we are concerned only with gross capital stock, just as in the previous chapter we were concerned only with gross capital formation.

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## 2. The historical sweep, 1850-1974 (Germany, FRG and US)

### 2.1 Sources and linkage of series.

#### a) Germany, F.R.G.

Gross capital stock data were compiled from two sources: The data 1850-1938 are from W.G.Hoffmann, Grumbach and Hesse, Das Wachstum der Deutschen Wirtschaft seit der Mitte des 19. Jahrhunderts. This source shows capital stock by economic sectors in prices of 1913 and in current prices, for the years 1850-1959<sup>3</sup>. The second source are the current series on gross capital stock [Brutto Anlagevermögen] at prices of acquisition [Neuwert] of 1962, for the period 1950-1971 from Wirtschaft und Statistik 1971/10, p.602, updated in the Statistische Jahrbuch 1975, p.521, table 26.18.

The linkage of the 2 series was possible, because it seems that grosso modo a similar methodology was followed for both historic (Hoffmann Grumbach) and Statistische Jahrbuch series<sup>4</sup>. Moreover, the data from the historical and current series overlap for the years 1950-1959. This permitted us to make a number of checks, establishing the continuity and comparability of the series.

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<sup>3</sup> see W.Hoffmann, Grumbach and Hesse, Das Wachstum der Deutschen Wirtschaft seit der Mitte des 19. Jahrhunderts, Springer Verlag; Berlin, Heidelberg, New York 1965, pp.253-256, table 39-40.

<sup>4</sup> see method of estimation in H. Lützel "Das reproduzierbare Anlagevermögen in Preisen von 1962" in Wirtschaft und Statistik 1971/10; Sonderdruck, J.C.B.Mohr, Tübingen 1971).

b) United States.

Data on gross capital stock 1850-1968 for all sectors of the economy (business, government, household) were compiled from two series: National Wealth by type of Assets, in current and constant prices, 1850 to 1956 published for selected years in the Historical Statistics of the United States<sup>5</sup> and National Wealth by type of assets, 1952-1968 (selected years), in current and constant prices, of 1958, given in the U.S. Statistical Abstract<sup>6</sup>.

At the present time, for lack of data on the government sector there are no series of total capital stock after 1968<sup>7</sup>. For the private sector, gross and net capital stock 1925-1970, by type of capital good (structures, equipment and since 1928 inventories) in current and constant prices of 1958 are given in the Historical Statistics of the United States<sup>8</sup>. For the business sector, gross and net capital stock (fixed non-residential business capital) by major industry group and legal form of organization, in current and constant prices of 1972 for the years 1925-1975 are given in the Survey of Current Business.<sup>9</sup>

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<sup>5</sup> Historical Statistics of the United States, Colonial Times to 1970, pp. 255-260, tables series F.

<sup>6</sup> U.S. Statistical Abstract 1975, page 411, table 674.

<sup>7</sup> "Work on stocks of non-residential government-owned capital has begun..." according to an article by John C. Musgrave in the Survey of Current Business, April 1976, p.47.

<sup>8</sup> Historical Statistics, op.cit. pp.257-258, Table F 470-479

<sup>9</sup> Survey of Current Business, op.cit. May 1976

## 2.2 Growth of Capital Stock, 1850-1970.

The compilation of the growth of capital stock, F.R.G. and the U.S. was based on the above mentioned sources and methods. For details of the compilations see Appendix Tables II.3 Germany, FRG Gross Capital Stock, Population and Prices, 1850-1974; Appendix Table II.6 U.S. Gross Capital Stock, Population and Prices, 1850-1968; and Appendix Table II.7 U.S. Gross Capital Stock [Business, Governments and Households] by type of asset, 1850-1968. These tables have been summarized in Appendix Table II.1, Capital Stock, total and per capita in constant prices of 1912/13, in Germany, F.R.G. and U.S.A., 1850-1974 (selected years).

### a) Total Capital Stock

Appendix Table II.1 indicates that in terms of constant prices of 1913, and at 1913 exchange rates, the 1850 level of total capital stock may have been higher in Germany (\$11.7 billion) than in the U.S. (\$4.6 billion, incomplete data). At that time, the German population 35.3 million was also more numerous than that of the U.S., 23.3 million. In 1880, the U.S. population 50.3 million had risen above Germany's 45.1 million and total capital stock reached the same level, little over \$23 billion in either country. By 1890, the U.S. total capital stock \$45.6 billion had risen above that of Germany's \$30.7 billion. The U.S. total capital stock remained at a higher level above Germany's ever since--although on a per capita basis, the development was different.

b) Per Capita Capital Stock

From 1850 to 1913, the growth of per capita capital stock was quite similar in the two countries. Not too much attention needs to be devoted to the fact that at certain times in history the per capita capital stock of Germany topped the U.S. (US 1850 data may be incomplete) or vice versa that the US topped Germany (i.e. in 1890) - in the last decades before World War I, the gap was closed.

In 1952 the FRG per capita capital stock at 1913 prices and 1913 exchange rates was \$775 (little higher than what it had been for Germany in 1900), while the U.S. per capita capital stock was \$1369 against \$747 in 1900. As was to be expected, shortly after the war, the FRG per capita capital stock was considerably lower than that of the U.S. But by 1968, the gap had considerably narrowed, with US per capita capital stock at \$1989 and the FRG's at \$1730. Here we are not quite sure whether the data based on 1913 prices can accurately reflect current situations. A comparison in 1968 prices, with FRG data converted to US dollars on the basis of 4D-Mark=1 US-Dollar (official 1968 rate) shows more of a difference in level.

1968 Per Capita Capital Stock in 1968 Prices:

U.S. = \$ 10,702

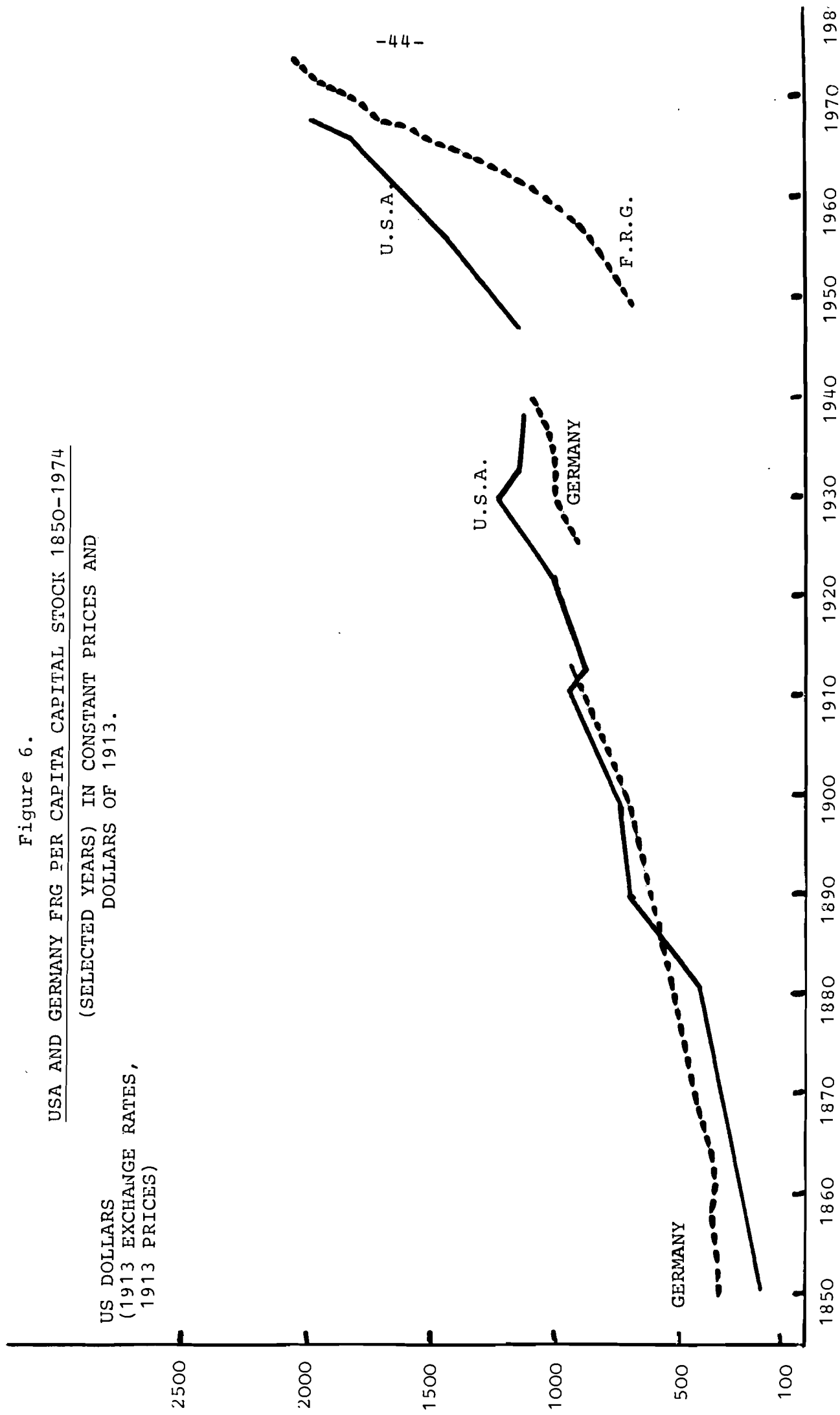
FRG = \$ 7,849

However, if we would use the "ideal dollar exchange rate" which tends to adjust for different prices and weights, see notes p.16 above, the difference in level would be less acute. Whatever price basis is used, the 1952 gap had definitely narrowed by 1968, and this reflects the FRG's rapidly rising investment coefficient, coinciding with a US investment coefficient that remained nearly constant. At the same time, the G.D.P. growth rates (total and per capita) were higher in the F.R.G. than in the U.S. Official U.S. estimates for total capital stock after 1968 are presently not available.

Figure 6.

USA AND GERMANY FRG PER CAPITA CAPITAL STOCK 1850-1974

(SELECTED YEARS) IN CONSTANT PRICES AND  
DOLLARS OF 1913.





### 2.3 Capital stock by broad economic sectors, 1850-1974

#### a) limits to comparability

The historical capital stock data by economic sectors lack a certain amount of comparability. First of all, for US historical data starting with 1850, the breakdown relates only to structures. The equipment is broken down into "producers goods" and "consumers durables", with no further allocation as to the sector.

Secondly, the groupings within the sectors differ between historical and more current series. For example, in Germany's capital stock data 1850 to 1938 the agricultural sector is overstated because capital stock includes inventories and rural dwellings. The dwelling sector is understated because it excludes rural dwellings. In the FRG 1950 to 1974 capital stock, farm inventories have been eliminated, and rural dwellings were moved out of the farm sector into "dwellings".

Apart from these discrepancies inside national capital stock data, we do not know whether the categories are comparable from one country to the other. For instance, would "dwelling" (German statistics) fully correspond to the US "residential, business and non-business?" More uncertainty exists about the comparability of "government" between the two countries.

#### b) Interpretation of data.

Notwithstanding the abovementioned obstacles to comparability the data on Appendix Table II.2 show changes in the capital stock brought on by progressive industrialization. In 1850, more than half of the entire capital stock of the German empire consisted of agricultural structures, equipment and inventories. The share of the agricultural sector may have been somewhat overstated because of the inclusion of inventories and rural housing. Whatever minor distortions due to matters of classification, the historical series show very clearly the relative decrease of agriculture's capital stock to about one fifth of the total in 1913. There was a further, slight decrease in the period between the wars, as the share of agricultural capital stock came down to 18% of total capital stock in 1938. With territorial changes brought on by the establishment of the FRG, agriculture's capital stock fell to 9% of total in 1950, and further

to 5% in 1974. In the U.S., the percentage share of agricultural structures decreased steadily from 25.9% of total structures in 1850 to 9.2% in 1922 and a mere 3.6% in 1968<sup>1</sup>. In the U.S., the general decrease of the importance of the farm sector coincided with a considerable increase of the share of government structures from under 4% in 1850 to nearly 30% of all structures in 1968. These data seem to underline the well known fact that government has become the biggest business in the U.S. Unfortunately, at the time of this writing, there are no up to date, official U.S. estimates available to show the share of government in total capital stock, comprising structures and equipment. However, such work is now in progress. The data on business capital stock have recently been supplemented by estimates on "residential, non-business capital stock, 1925-1975", and further additions on government capital stock has been planned<sup>2</sup>.

By contrast to the U.S., and keeping in mind the above stated obstacles to comparability, Appendix Table II.2 shows that in Germany and the FRG, the share of the government sector in total capital stock (structures and equipment) has rather diminished. The share of the government sector in total capital stock fell from 24% in 1880 to only 17% in 1974 (FRG). This does not mean that there is less government capital stock now, it simply means that the capital stock created by industry, trade and commercial services has expanded so much faster.

Finally, it should be noted that "dwelling", respectively "residential" are of considerable importance in both US (capital structures) and German (capital structures and equipment) data. This importance has increased over the historic sweep in both countries--it might signify an increase in the standard of living. Whatever the reason, in 1970 in the FRG, one third of the entire capital stock was dwellings (it has since dwindled a bit); in the U.S. residential structures amounted to over 40% of total structures in 1968.

---

<sup>1</sup> If we want to look at both structures and equipment, we have to use the "Business Capital Stock" 1925-1975 (published in the Survey of Current Business, April 1976, p.46). These data show that the share of business farm structures and equipment in total business structures and equipment fell from 9.6% in 1925 to 8.6% in 1939, were again 9.6% in 1952, but have fallen since to 7.5% in 1968 and 7.3% in 1975 (current prices).

<sup>2</sup> See John C. Musgrave. Fixed Non-Residential Business and Residential Capital in the United States, 1925-1975, published in U.S. Dept. of Commerce, Survey of Current Business, April 1976, p.46-52.

### 3. The More Recent Past, 1950-1974

#### 3.1 U.S., F.R.G. and U.K. Capital Stock by Industries, 1950-1974

##### a) U.S. Business Capital Stock

###### i) Definitions, Sources.

The preceding section dealt with the capital stock (structures and equipment) held by the economy as a whole including business (farm and non-farm), government, and household (part of residential). The following observations are limited to the capital stock (structures and equipment) held by the business sector. The "Fixed Non-Residential Business Capital" as it is known in official U.S. statistics, broken down by "Farm", "Manufacturing" and "Non-Farm Non-Manufacturing Industries", in current and constant prices of 1958 for the years 1950-1975 are shown in the U.S. Statistical Abstract, 1975<sup>1</sup>. These estimates were backdated to 1925 in an article recently published in the Survey of Current Business, with the constant price basis shifted to 1972<sup>2</sup>. See Appendix Table II.9 which is a xerox of the 1925-1975 Business Capital Stock data by major industry groups. We have checked the "business capital stock" against total capital stock, on the basis of data contained in the 1975 Statistical Abstract of the U.S. For details see Appendix Table II.8 U.S. Gross Capital Stock, total and business economy 1960 and 1968. Accordingly, the capital stock (current prices) held by the business economy represented 53.2% of total capital stock in 1960, and 51.7% in 1968.

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<sup>1</sup>U.S. Statistical Abstract 1975, p.411/412, tables 675 and 676.

<sup>2</sup>See Survey of Current Business, op.cit. It may be noted that the article contains estimates for Residential Capital (owner and tenant occupied), 1925-1975, and the announcement that work was in progress on Government held capital stock (structures and equipment).

See also notes on sources of U.S. capital stock data in section II.2.1. above.

ii) U.S. Business Capital Stock by Industries.

The 1970 business capital stock, in 1958 prices, at 80 industry level for input output aggregation are shown on Appendix Table III.6. Data were compiled by the U.S. Department of Commerce<sup>3</sup>. We have summarized the industries into 20 groups, following the scheme used by the Pestel team, see Appendix Table II.12. This table shows the relative importance of certain industry sectors in total business capital stock. Thus, the energy sector including mining, refining and utilities, accounts for nearly 20% of total business capital in 1970 (at 1958 prices). In fact, the share of the capital stock held by the energy sector would be somewhat higher, if the federally operated power plants had been included in the U.S. Dept. of Commerce BEA study. The manufacturing sector [excluding petroleum refining] accounted for "only" 22.9%. The table also shows that the U.S. economy is highly service oriented, as nearly half (47.4%) of all business capital is held by the services sector, excluding government.

b) F.R.G. Capital Stock by 19 Groups of Activities.

i) Reconciliation of Pestel team data With Other Sources.

The FRG capital stock data at 1962 prices for 19 groups of activities 1950-1972 prepared by the Pestel Team (May 1976) are shown in Appendix Table II.5.

The Pestel data on F.R.G. capital stock (structures and equipment) at 1962 prices for the period 1950 to 1972 are consistently lower than the "Brutto" capital stock (structures and equipment) in 1962 acquisition (Neuwert) prices and consistently higher than the net capital stock (structures and equipment) at 1962 replacement values (Wiederbeschaffungspreis) shown in Wirtschaft und Statistik or the 1975 Statistische Jahrbuch.

[We have written to Mr. Moeller in Hannover to enquire about the differences in the other sectors].

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<sup>3</sup>U.S. Department of Commerce, Bureau of Economic Analysis, A Study of Fixed Capital Requirements of the U.S. Business Economy, 1971-1980, Washington D.C., December 1975 [Internal Document].

## ii) Interpretation of Data

Notwithstanding these differences, the capital stock data compiled by the Pestel team are of great interest for the study of capital requirements, because they are broken down into 19 groups of activity. Of particular interest for the energy group are the energy capital stock data. In constant prices of 1962, they increased from 41.2 billion D-Mark in 1950 to 170.4 billion D-Mark in 1972. During that same period the share of the energy sector in the total capital stock of the F.R.G. hardly moved--it was 9.8% of total in 1950, slipping to 9.4% in 1972.

The sector "dwellings" fell from 33% in 1950 to 27.2% in 1972, this decrease was similar to what we had observed in the capital structures by sectors in the official German Statistics of the Statistische Jahrbuch.

The sector "Government" in the Pestel capital stock data shows an increase from 7.7% of total capital stock in 1950 to 15.8% in 1972. This development is quite different from what we observed in the official government statistics. Unfortunately, we do not have sufficient information on what exactly is included under Government capital stock in either set of statistics, Pestel and official German.

### c) Comparison of 1970 U.S. Business Capital and FRG Capital Stock (see Appendix Table II.12).

A comparison of the capital stock by industries between the two countries should be limited to "total capital stock excluding residential and government". This shows the relative importance of various sectors. Of relevance for the capital requirements' study may be the fact, that in the U.S. the total capital stock of the energy sector alone is almost as large as that of the total manufacturing sector (excluding petroleum refining). In the FRG, the capital stock held by the energy sector is also important, but it amounts to only little more than half of the manufacturing sector.

U.K.

Data on Gross Capital Stock at 1970 replacement cost by industry, 1964 to 1974 are shown in the U.K. Annual Abstract of Statistics<sup>9</sup>. We have reproduced these data in Appendix Table II.11. On Appendix Table II.12 we have tried to summarize the 1970 capital stock by categories similar to those used for the USA and FRG.

There are difficulties of classification as for instance the U.K. coal and petroleum products capital stock is lumped with the capital stock of chemical industries; also, we do not know for sure whether coal mining is included with the "mining and quarrying" or whether it is included in the group "coal, petroleum products and chemicals".

Despite these handicaps, certain characteristics emerge from the data on Appendix Table II.12. First of all, the share of agriculture in total capital stock is very low, 3.4% of total stock excluding Government and Residential. In the U.S. and FRG the corresponding shares were 7.5, respectively 11.4%. The share of the energy sector was 19.7% in the U.S. and 16.4% in the FRG. The share of the U.K.'s energy sector's capital stock would probably lie somewhere between these two values; it must be less than 19.5%, because of the inclusion of chemicals in the group of coal and petroleum products.

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<sup>a</sup>See United Kingdom, Central Statistical Office. Annual Abstract of Statistics 1975, p.328 table 345.

### 3.2 World Capital Stock by Regions, 1950-1970

#### a) Evaluation of Estimates

Global estimates of capital stock that include Western industrialized countries, developing countries, and Eastern European countries and China must be considered with a great deal of caution. This is due to the paucity of data, i.e. in the developing countries and the fact that conceptual differences in national accounts and pricing systems between East and West make a summation of the data from these groups highly problematic, not to mention the uncertainties involved in the conversion of data from national currencies to U.S. dollars. We know of two attempts to estimate global capital stock, by regions. There are the W.Ströbele estimates, used for a doctor's dissertation<sup>5</sup> and the United Nations' global estimates which were recently made available in a study on the future of the world economy<sup>5a</sup>. The two sources, as regards 1970 G.D.P., gross capital stock total and by regions, in U.S. dollar values (Ströbele at 1963 prices; UN at 1970 prices) are reviewed in Appendix Note VII. According to this review it seems that the Ströbele data for the world Gross capital stock were too high. If we convert the Ströbele 1970 total world capital stock (\$7.5 Billion in 1963 prices) to 1970 prices, we arrive at a total of \$9.4 billion, against the U.N. total of \$5.7 billion (1970 at 1970 prices). The UN gross capital stock for the World, although limited to Private Sector only, seems to be more realistic. We were able to check this out, by comparing the UN and Ströbele data for the North America region.

#### b) Extrapolation of the UN data to 1975

As stated above, the UN estimate for the world's gross capital stock, in 1970 amounted to \$5.7 billion in 1970 prices. We could assume a growth of 15% between 1970 and 1975; this is a conservative estimate, considering that the US business capital stock (in constant prices) grew by 20% 1970-1975 (See Appendix Table II.10). We could

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<sup>5a</sup>United Nations. Future of the World Economy, Preliminary (mimeographed). New York, 1975.

further assume that the deflator rose from 100 in 1970 to 130 in 1975. Thus, a conservative estimate would put the World's total gross capital stock in 1975 at 1975 prices, to \$ 8.5 billion.

c) Growth of Global Capital Stock by Regions.

A comparison of the regional percentage distribution of the 1970 capital stock between the UN Future and the Ströbele data shows remarkable agreement between the two sources. In both estimates for 1970 the developed countries' share in total capital stock amounted to over 70% of world total; North America\* held about 40%, Western Europe 26%, Japan 5%, etc. (see Appendix Table II.14). Developing countries held less than 10% with the remainder, about 20%, held by centrally planned economies. More significant than the percentage structure in a given year may be the development over time. For this purpose, we have reproduced the Ströbele data in Appendix Table II.13, although, as stated above, the level of the capital stock is too high. The changes in the percentage structure of world capital stock by regions between 1950 and 1970 reflect to some extent the observations on capital formation and capital stock made in the preceding sections of this chapter, namely the unprecedented growth of capital formation and stock, by Western European countries and Japan, which coincided with relative slower growth in the U.S. At the same time, Eastern European countries rapidly built up their capital stock. Consequently, the share of North America in global capital stock decreased from 58.7% of total in 1950 to 40.6% in 1970 (although in absolute values it nearly doubled). The implications of the shift in the percentage distribution of global capital stock, North America versus Western Europe and Japan could become even more thought provoking, if one considered the fact that Western Europe and Japan's capital stock are much newer (only a minor portion of their present capital stock predates 1950) than that of North America.

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<sup>5</sup> See W. Ströbele, Untersuchungen zum Wachstum der Weltwirtschaft mit Hilfe eines regionalisierten Weltmodells. Dissertation, Technische Universität Hannover, 1975.

\*North America is defined as U.S.A. and Canada



Another conclusion to be drawn relates to the slow growth of capital stock in the various regions of developing countries. Progress achieved between 1960 and 1970, during the much heralded UN Development Decade No.1, suggest that projections on the developing countries' energy demand should proceed with a great deal of caution. Perhaps greater attention should be devoted to the question of what is the developing countries' capacity to absorb increased energy consumption than to the question of wishful targets on industrial development reached by "consensus", i.e. at the Sixth Special Session of the UN General Assembly (1974), UN Conference on industrialization (Lima, Peru 1975), UNCTAD IV (at Nairobi, April 1976).

### III. Capital/Output Ratios

#### 1. Concepts

Capital output ratios are compiled with the capital stock as numerator and output, represented by value added, as denominator. The ratio simply indicates the number of capital units needed to produce one unit of output, during a given time period, for instance in the course of a year. When compiling capital/output ratios for the nation as a whole, one uses total capital stock (all sectors of the economy) divided by GDP (or GNP as the case may be). For the compilation of sectors of the economy (i.e. private sector, business sector) it is necessary to relate the appropriate capital stock to the particular share of GDP it serves to generate.

The capital/output ratio can be used to measure the efficiency of the use of capital stock in production. With no changes in capacity utilization, a declining capital output ratio over the years (or in space, country to country) means increased efficiency in the use of capital; conversely, if the capital/output ratio rises, the productivity of capital declines.

The fact that capacity utilization is not constant, was considered by the US Department of Commerce, Bureau of Economic Analysis (BEA). Their computations of capital/output ratios for the business sector 1947-1974, adjusted and unadjusted for capacity utilization, as well as their estimates of capacity utilization rates, are reproduced on Appendix Table III.3. If not specifically stated otherwise, the capital/output ratios used in this paper are unadjusted for capacity utilization.

#### Gross and net capital/output ratios

For the purpose of estimating additional capital stock required to generate additional GDP, capital/output ratios may be compiled as net capital stock over GDP. On the other hand, if the purpose is to estimate total capital requirements for a given output, it is useful to compile the ratio from Gross capital stock over GDP. The U.S. Department of Commerce (BEA) in their projections of 1980 capital requirements used 1970 capital output ratios (for the business sectors) derived from gross capital stock (adjusted and non-adjusted for capacity utilization). Throughout this paper, unless specifically stated otherwise, the capital/output ratios derive from gross capital stock.

In order to get an idea of the order of magnitudes, involved, see the following examples which show the difference in U.S. capital/output ratios, whether derived from gross or net capital stock and for the various sectors of the economy.

U.S. Capital Output Ratios

	Total Economy	Private* Economy	Business Sector
1968 <u>Gross Capital Stock</u> G N P	2.735	2.77	1.447
<u>Net Capital Stock</u> G N P	1.799 <sup>a</sup>	1.77	.
1970 <u>Gross Capital Stock</u> G N P	.	2.92	1.536
<u>Net Capital Stock</u> G N P	1.883 <sup>a</sup>	1.86	.

a) = Morris Norman estimates

\* = Total economy excluding Government

2. Estimates of Capital/Output Ratios

a) World average capital/output ratios by regions, 1950-1970

Capital output ratios, derived from broad aggregates of national accounts data were compiled by W. Ströbele for the world (including China) and by regions, for the period 1950-1970. As stated above, we found the Ströbele capital stock data to be too high; consequently his capital/output ratios are also too high. We tested this in the case of the U.S. 1968 capital/output ratio as 2.7 against the Ströbele 1968 capital output ratio for North America as 3.45. Still, we have reproduced the Ströbele capital output ratios for the world and by regions 1950-1970 (Appendix Table III.1) to show the trend.

Between 1950 and 1970, capital/output ratios showed rising trends, though at different intensity, in the various regions.

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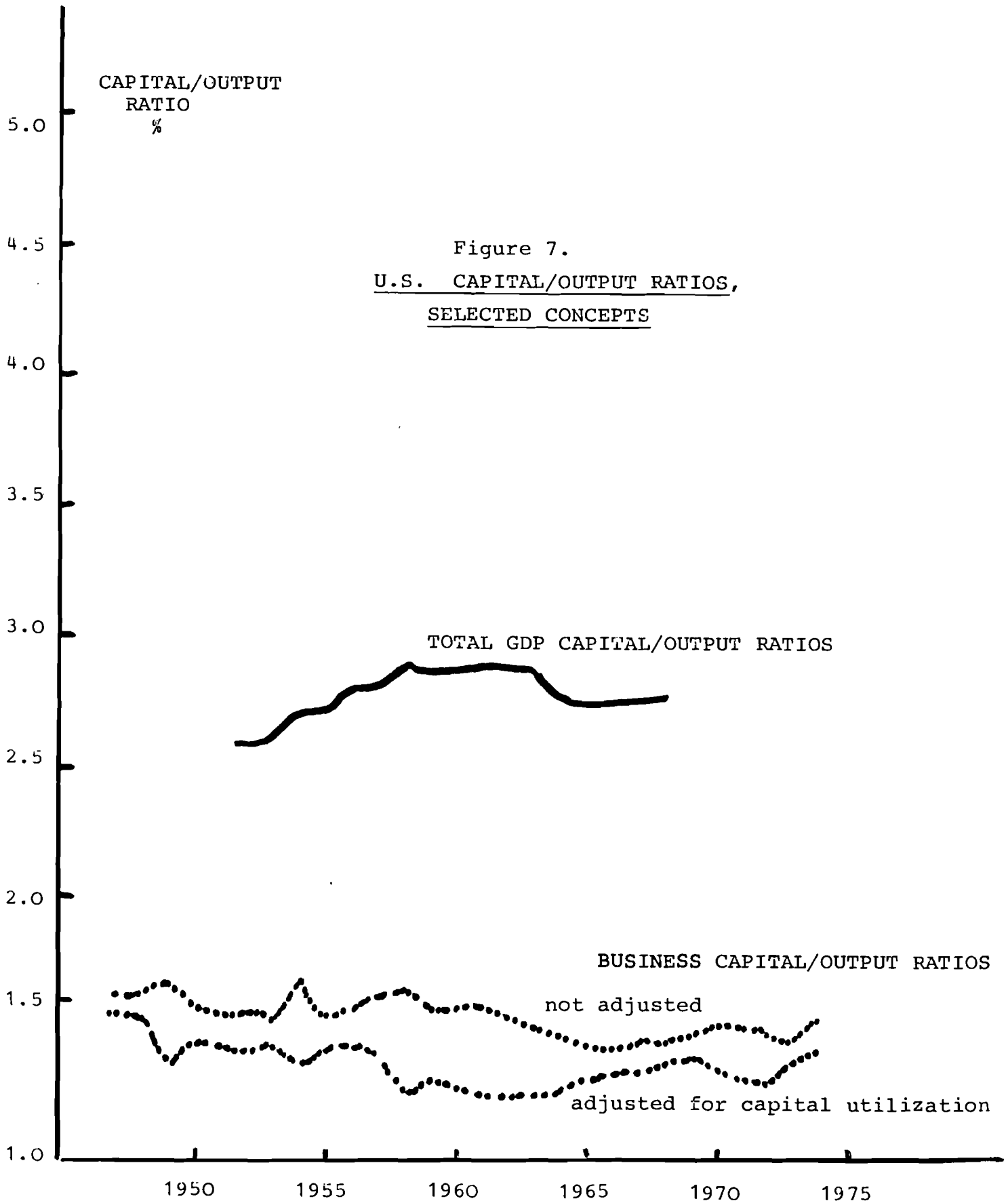
<sup>1</sup>W.Ströbele, op.cit.

The strongest increases were observed in the capital/output ratios in Western Europe, Japan and the developing countries. The slowest increases occurred in the Latin America region, where the coefficient remained almost constant. In the North America region, the trend was mixed. An upward swing, 1951 to 1958, was followed by a downward swing, 1959-1969, with some increase again in 1970. Most of the North America region consists of the U.S., and the above described movement is reflected in the U.S. business capital/output ratios discussed below.

b) United States

Total capital/output ratios for the economy as a whole can easily be compiled from the series on gross capital stock and GDP (See Appendix Table III.2)

The U.S. Department of Commerce, Bureau of Economic Analysis, has compiled capital/output ratios for the business economy 1947-1974 (see Appendix Table III.3), as well as capital/output ratios at 80 industry levels for input-output aggregation, for 1963 and 1967-1970 based on unscaled capital stock data (see Appendix Table III.4), and based on capital stock data scaled by capacity utilization (see Appendix Table III.5). For an interpretation of these data, reference may be made to the following two paragraphs, taken from the Commerce Department Study:



"...capital/output ratios for the total private economy indicate a mixed picture as regards trends during the post-war period. Moreover, this picture is somewhat different for the adjusted vs the unadjusted ratios. During the period 1947-1961, there was a clear-cut downward trend in the adjusted ratios, while the period 1962-1969 showed a reversal in the direction of this trend. Data for the more recent time period indicate no clear-cut trend with the 1973 ratio about equal to the 1969 ratio. However, given the impact of shifting industrial mix (due to both cyclical and more long-run factors) on the observed overall capital/output ratio for the total private economy, it would be inadvisable to assume the absence of clear-cut trends for the recent period in the capital/output ratios for individual industries.

The industry data on capital/output ratios for 1963 and 1967-70 were examined to determine if there were any clear-cut trends evident for recent years. For industries where such trends were evident, a continuation of these trends to 1980 was assumed. For other industries, the 1970 ratio or an average of the ratios for the 1967-70 period was used for 1980.

Since the historical capital/output ratios only extend to 1970, both their levels and trends do not reflect, to any considerable extent, the impact of recent developments related to energy and environmental concerns. This is fortunate since for the present study, as far as possible, we wish to examine separately the capital requirements of production and those of environment and energy."<sup>5</sup>

We have looked into the capital/output ratios of the industries comprising the energy sector, in 1963 and 1967-1970 (see Table below).

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<sup>5</sup> U.S. Dept. of Commerce, Bureau of Economic Analysis. A study of Fixed Capital Requirements of the U.S. Business Economy, 1971-1980, p.4.

Text Table . U.S.A. Capital/Output Ratios Energy Sector,  
1963-1970 (Data not adjusted for capacity utilization)

	Industry Classification	1963	1967	1968	1969	1970
7.	Coal Mining	.934	1.224	1.266	1.251	1.295
8.	Crude Petroleum and Natural Gas	5.630	5.002	4.947	4.882	4.732
31.	Petroleum Refining	.585	.541	.522	.522	.511
68a	Electr. Utilities*	4.846	4.659	4.642	4.709	4.714
68b	Gas Utilities	2.083	1.974	2.016	2.023	1.994

\*Excl. Federal Power Plants

Source: Compiled from Appendix Table III.4.

The table shows that capital/output ratios increased markedly in coal mining, whereas in other industries of the energy sector, the ratios decreased mildly. However, it would seem that the period of observation is too short for meaningful interpretation of data.

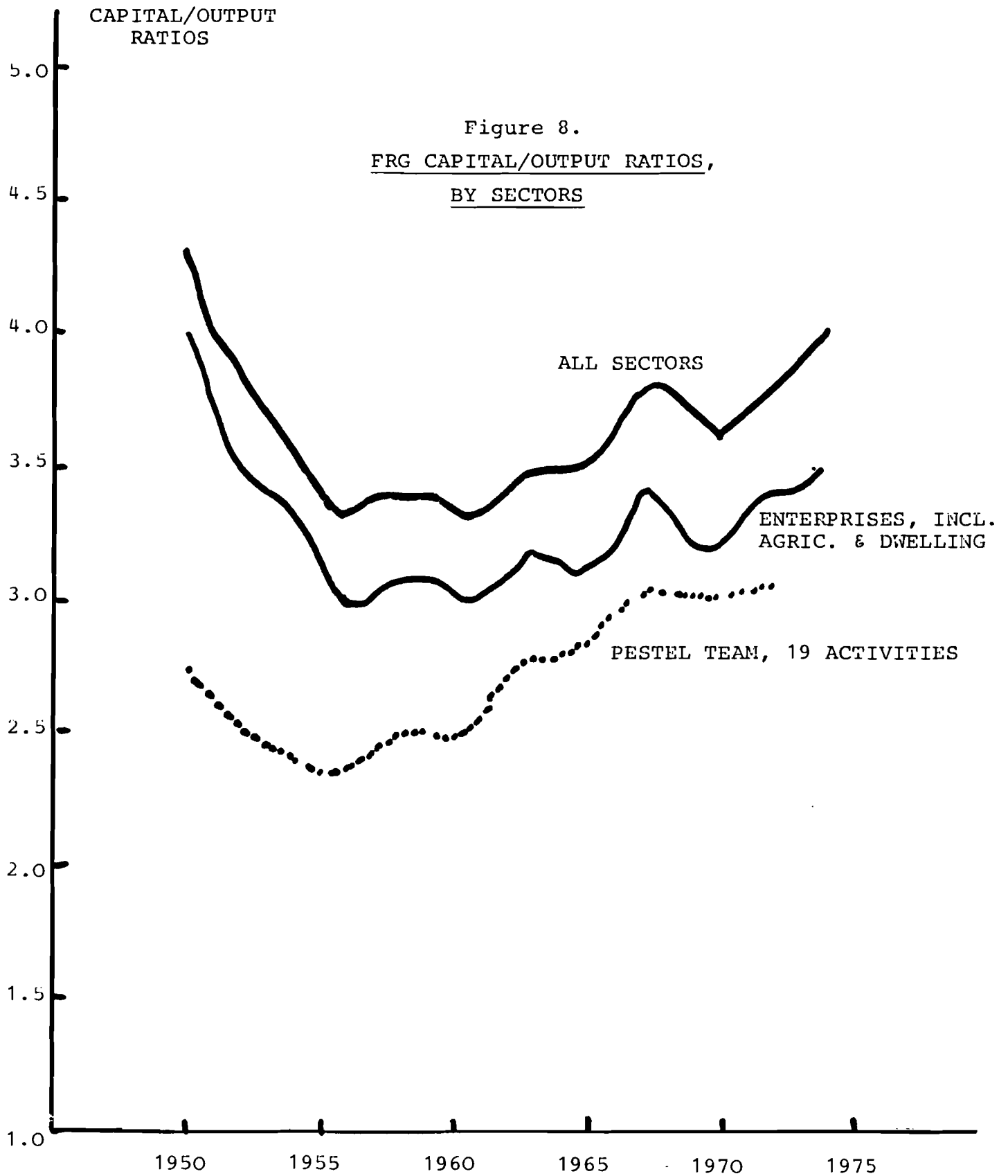
#### c) F.R.G. Capital/Output Ratios

##### i) Capital Stock/GDP output ratios, major sectors of the economy, 1950-1974.

Capital stock/GDP output ratios are compiled by the Statistische Bundesamt for the total economy and various economic sectors (see Appendix Table III.8). The estimates shown in the 1975 Statistische Jahrbuch were initially prepared by H.Lützel<sup>6</sup>. (See Appendix Table III.8). In his analysis of the data, he points to the development in 3 stages: From 1950 to 1956, the capital coefficients fell from 4.3 to 3.3. This was due to the availability of additional labor and the fact that the rehabilitation and expansion of capital stock required rather low investments. From 1956 to about 1961, the capital coefficient remained constant, while from 1962 onwards the capital coefficient started to rise slowly.

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<sup>6</sup> See H. Lützel, Wirtschaft und Statistik, op.cit., p.604.





ii) Capital stock/output ratios, 19 activities, 1950-1972

The capital coefficients, calculated by the Pestel Team (see Appendix Table III.9) show a diversity of trends for the various activities. Significant for the energy capital requirements study may be the fact that in the energy sector, the "capital coefficient" was rising from 4.22 in 1950 to 5.21 in 1972. Rising capital coefficients are shown also for agriculture, and a few individual industries, i.e. metal processing, as well as construction, trade, and total activities.

d) U.K. Capital/Output Ratios, 1964-1974.

Capital output/ratios for the total economy (all sectors) can be compiled from the "Gross capital stock at 1970 replacement cost (discussed above) and the "gross domestic product" at 1970 prices. (See Appendix Table III.10. There is a considerable difference in the level of GDP at 1970 prices, whether estimated at factor cost (£ 10<sup>9</sup> 47.8 in 1974 or at market price (£ 10<sup>9</sup> 56.7). We compiled capital/output ratios for both GDP concepts. [For the other GDP series, shown in this paper, we have used "GDP at factor cost", this is the concept selected by the UN for compilations of total and per capita GNP in U.S. Dollars, shown in the U.N. Yearbook of National Account Statistics, Vol.III.]

The level of the U.K. capital/output ratios (Appendix Table III.10) is amazingly close to the level observed for the FRG, all economic sectors.

For example, in 1974 the FRG capital/output ratio was 4.0, while that of the U.K. ranged between 3.66 and 4.35. In 1968, the ratios were FRG 4.8, U.K. 3.38 and 3.96. Both FRG and UK capital output ratios are considerably higher than the U.S. capital output ratio 1968=2.7 (See Appendix Table III.2).

U.K. capital/output ratios for sectors of the economy could be compiled from the detailed national accounts statistics that show GDP by industries (i.e. 1975 Annual Abstract of Statistics, p.319) and the gross capital stock by industries (see Appendix Table II.8a).

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Appendix A.

Note on Compilation of Long-Term GFCF Deflators.

Germany and F.R.G.

For the period 1850 to 1938, the deflator is implicit in the capital formation, incl. stocks, at market prices, current and constant of 1913, shown in B.R.Mitchell European Historical Statistics, 1750-1970.

The question is how to link the capital formation price index, 1913=100 with the deflators of the post World War II years? According to the Statistische Bundesamt, backtracking of current price indices to pre World War I years is possible only for the cost of living; basic materials,; and residential construction prices. (Bevölkerung und Wirtschaft 1872-1972, p.245). The cost of living index is not applicable for prices of capital formation; we also decided against the "basic materials" index, because it includes agriculture, forestry, and imports. We did select the residential construction price index, because construction is an important item in capital formation. Here the assumption is that residential construction prices moved in the same way as non-residential construction.

Germany and F.R.G. Long Term Price Index Numbers

	Cost of living	Basic materials	Residential Construction Prices	Deflator Capital Formation
	(1)	(2)	(3)	(4)
1913	.	100	100	100
1913-14	100.0	102.5	103.5	.
1925	141.8	139	171	160.2
1937	125.1	96	135	121.3
1938	125.6	95	136	117.7
	—	—	—	—
FRG 1950	195.7	182	252	.
1951	211.0	218	291	.

Sources: Col.1,2, and 3 compiled from Statistische Bundesamt. Bevölkerung und Wirtschaft, 1872-1972, chapter IX, Prices. Col.4 = deflator implicit in German capital formation data compiled from B.R.Mitchell, European Historical Statistics 1750-1970.

We then took the capital formation deflator, implicit in current statistics, with 1962=100 and shifted the base to 1950=100. The next step is to take the residential construction price index in the F.R.G. for the year 1950 as 252 (1913 Reich = 100) and to extrapolate it with the above mentioned capital formation deflator, 1950=100.

The result of these calculations is that the F.R.G. 1974 capital formation deflator rose to 659 of 1913 (Reich) = 100; at the same time, the U.S.A. 1974 capital formation deflator stood at 657.3 of 1912-16 = 100.

## U.K. Deflators

For the period 1830-1913, the deflator is implicit in the capital formation data in current and 1900 prices compiled from B.R. Mitchell European Historical Statistics (op.cit). We shifted the price basis for this period from 1900 to 1913. Next we have a series of capital formation data for the period 1913 to 1947, in current and constant prices of 1938, also from B.R. Mitchell. Again we shifted the price basis to 1913 = 100 and extrapolated the above mentioned deflator.

Current series of capital formation are contained in the U.K. Central Statistical Office Economic Trends annual supplement, 1975. This source gives capital formation in current prices 1946 to 1974, and in constant prices of 1970, for the period 1948 to 1974.

The question is therefore how to link the two deflators 1830-1946 and 1947-1974, when there is no deflator for 1947. We bridged this gap by assuming that the four years' average (1948-1951) was similar to the 5 year average (1947-1951) which we could not get.

[We could have refined our estimates by assuming that the GFCF deflators movement was similar to that of the wholesale prices (WPI).]

U.K. Wholesale Price Index, 1947 = 100<sup>a)</sup>

1946	91
1947	100
1948	114

a) Compiled from B. Mitchell, European Historical Statistics, op.cit. p. 739

However, the adjustment did not seem to warrant the effort-- because of the various uncertainties involved in our long term series].

## France

The deflators are implicit in the gross fixed capital formation data in current and constant prices, shown in the European Historical Statistics (op.cit.), as follows:

1825/1834 to 1935/38:	see	GFCF	in	1905/13	prices
1938 and 1949 to 1959:	"	"		1959	prices
1959 to 1971	:	"	"	1963	prices

The only missing link are 1938 GFCF in 1905/13 prices. We overcame this handicap by assuming that the 1938 deflator was the same as the 1935/38 average. We looked at the French wholesale price index, 1900 to 1972 shown in the Annuaire Statistique de la France 1974, p.612 and found that the 1938 prices were somewhat above the 1935/38 average, as France by 1938 was recovering from the depression. However, considering the very long time span covered, it would not have been worthwhile to make an adjustment. For a comparison of the French wholesale price index with base shifted to 1905/13=100 see data below:

	France: Wholesale Price Index	Gross Fixed Capital Formation Deflator
	1905/13=100	1905/13=100
1905/13	100	100
1920/24	497	442
1925/34	622	525
1935/38	569	515
1938	746	.
1950	14 925	9 090
1951	19 067	11 050
1952/56	19 201	13 110
1967/61	23 537	16 510
1962/66	27 231	20 320
1967/71	31 149	24 350
1972	36 463	.

These data show that the GFCF deflators though trailing the WPI, are within the same (astronomic) order of magnitudes.



## United States

The historical series on gross domestic capital formation 1869/1873 to 1927/31 are given in current and constant prices of 1929 (Historical Statistics, Tables F 104-130 and F 131-157). The deflator, implicit in these series is extrapolated to 1942/46 on the basis of the deflator implicit in the gross domestic government investments in current and constant prices of 1958, shown for the period 1929 to 1971 in the Survey of Current Business, Feb. 1973, p.9. Here, the assumption is that the domestic government and private investment price movement was the same as that of domestic government investment.

The 1947/51 deflator is then extrapolated to 1974 on the basis of the deflator implicit in the series on gross domestic private investments in current and 1958 prices, given in the Survey of Current Business (1973 Supplement and Monthly issues). Here the assumption is that government and private gross domestic investment prices rose by the same rate as gross domestic private investment.

The extrapolations indicated above, and the shifting of base periods from 1929 and 1958 to 1912/16 may account for minor inaccuracies in the data.

Appendix B.

The UN Future of the World Economy, comparison of selected data with other sources.

The following comparisons do not relate to the UN projections; they are limited to some of the statistics of the year 1970 serving as basis for the UN projections. These data are:

1. World G.D.P.
2. Capital formation (annual investments)
3. World Capital Stock by regions

1. Gross Domestic Product

As a rule, the UN Yearbook of National Accounts Statistics (Latest issue checked: 1973, Vol.III) would not include the countries of Eastern Europe, the Soviet Union, and China People's Republic into the Standard Table on "Estimates of Total and Per Capita GDP expressed in US Dollars". However, the UN Future of the World Economy includes these countries' National Accounts and other input/output data in US dollar values. The question is what was the adjustment, if any, to make the "Net Material Product" commensurate with GDP? Next question, what exchange rates were used to convert the CPE data to US dollars?

We have checked the GDP data from the UN Future of the World Economy against the W.Ströbele data and find considerable agreement between the two sources, both as regards absolute values, and percentage distribution by regions, etc. For details see Table 1.

2. Capital Formation

a) Coverage

As stated above in Chapter I, we included under the "annual gross fixed domestic capital formation" the additions in "Equipment and Structures from all sectors of the economy (Government, business and residential or households). UN Future data are not given with sufficient detail to check on their coverage. We tried to check it out for Japan, because this seemed to be the only case where data for an individual country were shown. See table 2 below. It seems that UN Future data, like ours, exclude inventories from capital formation. However, UN Future capital formation data seem

to be limited to certain sectors of the economy; they exclude Government and possibly the owner occupied residential building and a number of services.

b) Investment Coefficients

The IIASA working paper devotes considerable attention to the "investment coefficient;" this is defined in the IIASA paper as the percentage share in total GDP of gross fixed capital formation (structures and equipment) from all sectors of the economy (government, business, residential). This definition checks with the one used by Simon Kuznets, who had observed that before World War II, developed countries saved at most 20% of their GDP, whereas in the 1950s, the rate had increased to 25%. This statement was corroborated in the IIASA paper.

It may be noted that the UN Future uses an other concept, stating that "the ratio of gross fixed investment to total final internal use (sum of investment, private and public consumption) is expected to increase from 20 per cent on the average in 1970, to 41 per cent in 2000 in the Middle East and African oil countries, from 17-20 to 31-33 per cent in Latin America, and from 15 to 23-25 per cent in non-oil Asia and Africa." (UN Future . . . , p. 31)

As stated above, it would be useful to find out how the UN Future defines "gross investment" (plants and equipment), which sectors of the economy are included, and what is the source of the data (Input/Output Tables or National Accounts). Likewise, as regards consumption, may we assume that this relates to all sectors of the economy, and what is the source of the data (National Accounts?).

### 3. World Capital Stock by Regions

#### a) Absolute Values

The 1970 capital stock data in the UN Future are broken down into "Equipment and Plant;" we have compared the North America region against U.S. data for the total economy and for the business economy; and against the Stroebele data for the North America Region. We also compared the Japan capital stock data in the UN Future against the Stroebele data.

For the North America Region, the 1970 capital stock data in the UN Future of the World Economy, which include Canada and Puerto Rico, are about the same as the US Capital stock, all sectors, for 1968. This means that, in fact, the UN Future data are lower than the US Statistical Abstract data, a matter which can be explained by the fact that UN Future limits the capital stock data to certain sectors of the economy. For the world as a whole (and for Japan where we could easily test it), the UN Future capital stock data are much lower than the W. Stroebele data shown in the IIASA "Capital" paper. Thus, in 1970, according to the UN Future the Planet Earth costs "only" \$5.7 Trillion (current 1970 prices) against Ströbele's \$7.5 Trillion (1963 prices) or \$9.4 Trillion (1970 prices) assuming that the deflator has increased from 100 in 1963, to 123 in 1970. (See Table 3 )

b) Regional Distribution of World Capital Stock

The percentage distribution of the World Capital Stock by regions in the UN Future of the World Economy is quite similar to that of the Stroebele data. In both compilations, the North American Region accounts for about 40% of 1970 World Capital and total developed countries with market economies account for about 73% of the World Capital stock.

As regards the rest of the world there are some, perhaps minor, discrepancies given the uncertainty of the data involved. Thus, in 1970, the share of the Centrally Planned Economies (Eastern Europe, Soviet Union, China) amounts to 20.7% of World Capital Stock in the UN Future, and to somewhat less, namely 17.3% in the Stroebele data. For details, see Table 4.

Table 1. G.D.P. Selected Countries and Regions, 1970

	UN Future of the World Economy (Current Prices) \$ Billion = %	W.Ströbele (In prices of 1963) \$ Billion = %
R e g i o n :		
North America (incl. U.S., Canada, Puerto Rico)	1059.5 = 32.9	841.1 = 33.3
Japan	199.8 = 6.2	143.1 = 5.7
Soviet Union	434.9 = 13.5	473.1 = 18.7 <sup>a</sup>
Eastern Europe	164.4 = 5.1	<u>a/</u>
China, Peoples Republic	134.8 = 4.1 <sup>b/</sup>	90.7 = 3.5
World	3 220 100.0	2 525.6 100.0

a) Eastern Europe included with Soviet Union

b) Korea, Mongolia included.

Note: Assuming that the GDP deflator rose from 1963=100 to 1970 = 125, the Ströbele World GDP could be estimated as \$ 3 157 Billion in 1970, which is quite similar to the UN Future of the World Economy \$3 220 Billion

Table 2. Capital Formation, Japan 1970

	UN Future of the World Economy	IIASA Data compiled from UN Yearbook of National Accounts Statistics	
	\$ Billions		Yen Billions = \$ Billions
Investments:			
Equipment	20.9	Equipment	
Plant	<u>23.7</u>	Construction	<u>          </u>
[Selected Sectors]	44.6	All Sectors	24843.6 = <u>69.47</u>
G.D.P.	199.8		71 167.0 = 199.7
[Investment as Percent of G.D.P.]	22.3%		34.9% = 34.7% ]

Table 3. Gross Capital Stock (Structures and Equipment)  
in North America and the World, 1970

	UN Future of the World Economy	US Statistical Abstract		W. Ströbele	
		All Sec- tors	Busi- ness Sector	All Sectors of the Economy	
	1970 Prices \$ 10 <sup>9</sup>	1968 Prices \$10 <sup>9</sup>	Prices \$10 <sup>9</sup>	Prices of: 1963 \$10 <sup>9</sup>	1970 <sup>a</sup> \$10 <sup>9</sup>
North America	2252	2148 <sup>b</sup>	1339 <sup>b</sup>	3047	3809
World	5693	.	.	7511	9389

a) = Estimated Deflators

1963 = 100

1970 = 125

b) = United States



Table 4. Capital Stock by Regions, 1970

UN Future of the World Economy		W. Stroebele	
	1970 Capital Stock  Current Prices  Billion \$ = %		1970 Capital Stock  1963 Prices  Billion \$ = %
<u>Developed Market Economies</u>			
North America:	2251.7 = 39.5	North America	3047.1 = 40.6
W. Europe, High Income	1345.7 = 23.6	W. Europe	1937.6 = 25.8
W. Europe, Medium Income	115.7 = 2.0		
Japan (and Ryukyu Islands)	313.2 = 5.5	Japan	361.2 = 4.8
Oceania	79.3 = 1.4	Other developed	191.0 = 2.5
South Africa	27.0 = 0.5		
	= 72.5%		= 73.7%
<u>Developing Market Economies</u>			
Latin America		Latin America	298.5 = 4.0
Medium Income	155.3 = 2.7		
Low Income	48.5 = 0.8		
Middle East/Africa oil	26.7 = 0.5	Middle East	77.1 =
Asia, Low Income	110.1 = 1.9	S. E. Asia	251.2 = 5.2
Africa, arid	26.6 = 0.5	Middle Africa	68.4 =
tropical	21.2 = 0.4		
	6.8		9.2
<u>C. P. E.</u>			
Eastern Europe	288.4 = 5.1	USSR/East. Europe	941.6 = 12.5
Soviet Union	737.9 = 13.0		
China	147.1 = 2.6	China	343.9 = 4.6
	20.7		17.1
World	5693.0 = 100.0	World	7511.5 = 100.0
	(5694.4)		(7517.6)

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C.I. CAPITAL FORMATION AND GDP



Appendix Table I.1.

Population, Per Capita G.D.P. and Prices in the Developed Countries, 1850-1975  
(selected years)

(G.D.P. in constant prices and dollars of 1970\*)

United Kingdom			Germany/F.R.G.			U.S.A.		
	G.D.P.		G.D.P.		GNP Deflators 1970=100	G.D.P.		GNP Deflators 1970=100
	Population	Per capita G.D.P.	Population	Per capita G.D.P.		Population	Per capita G.N.P. 1970 prices	
	10 <sup>6</sup>	\$	10 <sup>6</sup>	\$	%	10 <sup>6</sup>	\$	%
1852/56	21.4	500	36.2	362	16.5	.	.	.
1867/71	25.2	572	40.5	461	18.5	40.9 <sup>a</sup>	404	18.2
1887/91	32.1	780	48.6	825	14.9	61.8	547	14.1
1907/11	41.3	883	63.7	1087	17.7	90.7	947	16.8
1927/31	44.6	850	64.6	1176	27.0	121.7	2347	30.6
1932/36	45.5	891	66.0	1203	22.3	126.4	.	24.3
1952/56	50.8	1302**	51.9	1402	61.9	163.1	3466	66.2
1962/66	53.5	2076**	58.0	2424	82.2	191.7	4158	80.8
1967/71	55.2	1848**	60.2	2910	96.0	202.8	4767	95.4
1970	55.4	1867**	60.7	3096	100.0	204.9	4769	100.0
1975	56.0	2006**	61.8	3300	139.8	213.4	5142	136.6

\*Exchange Rate: 1\$ = DM 3.648 a = 1869/73

1£ = \$ 2.394

\*\*GDP at Factor Cost

Appendix Table I.2.

Average Annual Growth Rates of Per Capita G.D.P. in Constant Prices,  
Developed Countries, 1847/51 - 1975

	United Kingdom	Germany/F.R.G.	U.S.A.
Y e a r s	%	%	%
1847/51	0.0	.	.
1852/56	2.5	1.6	.
1857/61	1.4	1.6	.
1862/66	-0.2	2.2	.
1867/71	4.3	1.0	.
1872/76	0.7	2.9	3.0*
1877/81	-0.2	-1.3	5.6*
1882/86	0.5	2.5	2.9*
1887/91	1.2	1.1	0.7*
1892/96	1.0	3.3	1.3
1897/01	0.8	0.2	2.9*
1902/06	-0.1	2.7	3.1*
1907/11	0.4	1.0	1.2*
1912	.	.	.
1913	.	.	.
1912/16	.	.	0.8*
1917/21	.	.	1.3*
1922/26	1.8	.	3.0*
1927/31	0.7	.	0.7*
1932/36	2.8	.	2.3
1937	.	.	.
1938	.	.	.
1937/41	5.2	.	.
1942/46	.	.	.
1947/51	.	FRG .	2.9
1952/56	-0.3	7.7	1.3
1957/61	4.4	6.3	0.5
1962/66	2.4	3.5	4.4
1967/71	1.9	4.1	1.7
1970	-0.8	4.7	-1.5
1971	1.9	2.0	2.2
1972	1.4	2.7	4.7
1973	4.8	4.7	6.6
1974	0.9	0.3	-3.1
1975	-1.8	-3.1	-2.5

\*:Represents the average growth from one five years period to the other, (not average growth for each year within the five years period).

Sources: Compiled from National Historic and Current Statistics.



Appendix Table I.3.

Gross Domestic Product, Total, in constant prices,  
Developed Countries, 1847/51-1975

(Data in National Currencies)

Y e a r s	United Kingdom 10 <sup>6</sup> £	Germany/FRG 10 <sup>9</sup> Mark	U.S.A. 10 <sup>9</sup> Dollars
	In prices of 1900	In prices of 1913	In prices of 1929
1847/51	599	.	.
1852/56	680	10.9	.
1857/61	784	12.5	.
1862/66	855	14.6	.
1867/71	993	16.3	9.1a)
1872/76	1234	20.4	11.2
1877/81	1328	21.0	16.1
1882/86	1445	22.5	20.7
1887/91	1595	26.3	24.0
1892/96	1728	30.9	28.3
1897/01	2013	36.2	35.4
1902/06	2163	41.4	45.0
1907/11	2278	47.4	52.5
1912	2388	51.9	.
1913	2514	52.4	.
	In prices of 1938		
1912/16	.	.	59.7
1917/21	4619	.	67.7
1922/26	4342	47.0b)	84.4
1927/31	4796	50.4	97.0
1932/36	5010	53.5	84.7
1937/41	6233	.	116.6
1942/46	.	.	171.2
		In prices of 1970	
1947/51	24700*	FRG .	446.8
1952/56	27400*	265.9	567.6
1957/61	31600*	382.8	638.3
1962/66	37100*	513.2	792.7
1967/71	42700*	639.4	967.0
1970	43300*	685.6	977.1
1971	44200*	706.1	1009.1
1972	44900*	730.2	1066.1
1973	47300*	767.3	1144.9
1974	47800*	770.7	1117.5
1975	47000*	744.0	1097.3

a) = 1869/73

b) = 1925/26

c) = 1948/51

Sources: National Historic and Current Statistics

\* = GDP at factor cost (UK GDP 1947/51-1975)

Appendix Table I.4. Investment Coefficients (Share of GFCF in GDP) in  
Selected Developed Countries, 1830-1975.  
Compiled from Data in Current Prices.

Year	Germany, FRG	U.K.	U.S.A. * Government Business Business only Residential	France	Japan
1832/36	.	3.9	.	16.2 e)	.
1837/41	.	5.9	.	.	.
1842/46	.	5.5	.	17.7 f)	.
1847/51	8.6 a)	8.0	.	17.5 g)	.
1852/56	9.5	6.4	.	20.5 h)	.
1857/61	8.8	5.6	.	19.2 i)	.
1862/66	11.9	8.3	.	19.8 j)	.
1867/71	12.2	6.8	14.8 d)	19.3 k)	12.3r)
1872/76	14.6	7.8	15.9	21.3 l)	12.4s)
1877/81	9.0	7.7	15.5	21.0 m)	11.9t)
1882/86	10.1	6.3	16.6	.	13.6u)
1887/91	11.9	5.4	19.9	.	13.8v)
1892/96	12.0	6.2	21.3	.	16.7w)
1897/01	15.3	8.9	20.4	24.1 n)	18.5x)
1902/06	14.5	8.7	20.5	19.6 o)	18.4y)
1907/11	14.6	5.8	19.4	19.2 p)	18.1z)
1913	15.6	5.9	.	.	.
1912/16	.	4.8	19.0	.	.
1917/21	.	5.3	19.7	.	.
1922/26	9.7 b)	8.1	19.8	.	.
1927/31	6.8	8.8	18.7	24.1 n)	18.5x)
1932/36	5.7	8.9	12.1	19.6 o)	18.4y)
1937/41	.	8.4	15.9	19.2 p)	18.1z)
1942/46	.	4.7	9.8	.	.
1947/51	.	12.2	18.6	10.2	.
	FRG				
1952/56	19.1 c)	14.4	18.1	9.6	20.1q)
1957/61	21.8	15.9	18.1	9.5	30.2
1962/66	26.0	17.5	18.1	9.9	31.8
1967/71	24.7	18.5	17.5	10.3	34.4
1970	26.4	18.8	17.1	10.3	34.9
1971	26.7	18.6	17.5	9.9	34.2
1972	26.2	18.9	18.3	10.2	34.4
1973	24.7	19.3	18.5	11.4	36.6
1974	22.5	20.0	17.6	10.5	34.3
1975	21.1	19.8	.	9.9	30.9

a) = 1850/51  
b) = 1925/26  
c) = 1950/51  
d) = 1869/72  
e) = 1825/34  
f) = 1839/44  
g) = 1845/54  
h) = 1855/64

i) = 1865/74  
j) = 1875/84  
k) = 1885/94  
l) = 1895/04  
m) = 1905/13  
n) = 1920/24  
o) = 1925/34  
p) = 1935/38  
q) = 1955

r) = 1887-1896  
s) = 1892-1901  
t) = 1897-1906  
u) = 1902-1911  
v) = 1907-1916  
w) = 1912-1921  
x) = 1917-1926  
y) = 1922-1931  
z) = 1927-1936

\*=Share of GFCF  
in GNP

Sources and methods, see text. Note US Business Inv. Coeff. represents Gross Domestic Private Fixed Non-residential Investment, see Historical Stat. of the US, Colonial Times to 1970.

Appendix Table I.5: Deflators Gross Fixed Capital Formation,  
1830-1975.  
Index Numbers, 1970=100

Year	Germany, F.R.G.	U.K.	U.S.A.	F r a n c e 1905/13=100; 1970=100	
1832/36	.	14.6	.	114 e)	.
1837/41	.	15.3	.	.	.
1842/46	.	14.4	.	115 f)	.
1847/51	14.1 a)	14.0	.	.	.
1852/56	16.5	15.2	.	119 g)	.
1857/61	15.7	15.1	.	.	.
1862/66	14.3	15.6	.	127 h)	.
1867/71	18.5	16.0	18.3 d)	.	.
1872/76	19.1	18.5	17.7	125 i)	.
1877/81	14.2	16.2	14.8	.	.
1882/86	13.6	15.2	14.9	116 j)	.
1887/91	14.9	14.4	14.1	.	.
1892/96	13.8	13.9	12.6	99 k)	.
1897/01	16.3	15.4	13.8	.	.
1902/06	16.8	15.0	15.1	95 l)	.
1907/11	17.7	15.4	16.8	100 m)	.
1912	18.9	16.6	.	.	.
1913	18.9	17.1	.	.	.
1912/16	.	19.7	19.0	.	.
1917/21	.	38.9	32.9	.	.
1922/26	28.1 b)	32.1	31.2	441 n)	.
1927/31	27.0	27.9	30.6	525 o)	.
1932/36	22.3	26.0	24.3	514 p)	.
1937	23.0	29.1	.	.	.
1938	22.3	29.6	.	.	.
1937/41	.	32.1	27.8	.	.
1942/46	.	44.0	37.2	.	.
1947/51	51.6 c)	51.6	56.8	.	39.0 c)
1952/56	59.5	64.0	66.7	.	51.2
1957/61	66.9	72.1	77.0	.	64.4
1962/66	79.2	80.2	81.7	.	79.3
1967/71	89.6	95.4	95.7	.	95.0
1970	100.0	100.0	100.0	.	100.0
1971	107.2	108.6	105.8	.	104.7
1972	111.8	118.9	109.1	.	109.6
1973	116.9	138.1	115.1	.	117.2
1974	124.6	166.0	124.9	.	135.2
1975	128.2	205.9	139.6	.	149.5

a) = 1850/51  
b) = 1925/26  
c) = 1950/51  
d) = 1869/72  
e) = 1825/34  
f) = 1839/44  
g) = 1855/64

i) = 1865/74  
j) = 1875/84  
k) = 1885/94  
l) = 1895/04  
m) = 1905/13  
n) = 1920/24  
o) = 1925/34  
p) = 1935/38

Appendix Table I.6. Population Growth, Developed Countries, 1830-1975

	Germany, F.R.G.	U.K.	U.S.A.	France
	I n d e x N u m b e r s			
Year	1913=100	1913=100	1912/16=100	1905/13=100
1832/36	45.7	39.3	12.7	83 e)
1837/41	47.2	42.1	16.9	
1842/46	50.7	44.5	19.8	87 f)
1847/51	53.6 a)	47.8	22.9	
1852/56	54.1	50.4	26.9	91 g)
1857/61	55.6	53.6	31.1	
1862/66	58.4	55.8	35.3	95 h)
1867/71	60.5	59.3	41.5 d)	
1872/76	62.8	63.1	44.6	92 i)
1877/81	66.6	67.3	49.8	
1882/86	69.8	71.5	56.0	95 j)
1887/91	72.6	75.5	62.5	
1892/96	76.8	80.5	69.1	97 k)
1897/01	82.5	86.8	75.7	
1902/06	88.8	92.7	83.2	98 l)
1907/11	95.1	97.2	91.6	100 m)
1912	98.8	99.5	.	.
1913	100.0	100.0	.	.
1912/16	.	100.2	100.0	.
1917/21	.	102.8	106.4	.
1922/26	93.5 b)	104.9	115.2	99 n)
1927/31	95.5	107.1	123.1	103 o)
1932/36	98.5	109.9	127.9	105 p)
1937	101.3	111.3	.	.
1938	102.2	111.8	.	.
1937/41	.	112.5	132.5	.
1942/46	.	115.1	136.3	.
1947/51	75.2 c)	117.9	151.5	106 c)
1952/56	77.5	119.5	165.0	109
1957/61	82.0	122.5	179.9	115
1962/66	86.6	126.8	194.0	122
1967/71	89.9	129.9	205.2	128
1970	90.6	130.4	207.3	129
1971	91.5	130.8	209.5	130
1972	92.1	131.3	211.3	131
1973	92.4	131.6	212.9	132
1974	92.6	131.7	214.4	134
1975	92.3	131.9	216.1	135
	I n M i l l i o n s			
1975	61.8	56.0	213.6	52.7

a) = 1850/51	i) = 1865/74
b) = 1925/26	j) = 1875/84
c) = 1950/51	k) = 1885/94
d) = 1869/72	l) = 1895/04
e) = 1825/34	m) = 1905/13
f) = 1839/44	n) = 1920/24
g) = 1845/54	o) = 1925/34
h) = 1855/64	p) = 1935/38

Appendix Table I.7.

Components of GDP by kind of economic activity  
in 1970 (Cross Section Analysis)- Market Economies

Countries	GDP Total	Agriculture, Forestry and Fisheries	Industry: Mining Manufactures, Electricity, Gas and Water Supply	(Manufacturing)	Construction	Trade, Wholesale and Retail	Transportation	Other	Total
Mill.US\$ P e r c e n t a g e D i s t r i b u t i o n									
a) Rich and super-rich, mostly developed, with 1970 per capita GDP \$1,700 and more									
U.S.A.	983 240	3	30	(26)	5	17	6	39	100
Sweden	32 913	4	28	(25)	8	10	6	44	100
Kuweit	3 036	0	67	(4)	3	7	3	20	100
Canada	82 823	4	26	(20)	5	11	8	46	100
Denmark*	15 573	7	29	(27)	9	14	9	32	100
F.R.G.	187 694	3	46	(43)	8	14	6	23	100
Australia*	36 569	6	30	(24)	8	12	8	36	100
Norway	11 111	6	26	(22)	8	12	16	32	100
France	144 734	6	36	.	10	—	48	—	100
Belgium	25 731	4	35	(32)	7	13	7	34	100
Netherl.	31 650	6	32	(29)	7	13	8	34	100
Finland*	10 379	12	30	(27)	8	10	6	34	100
U.K.	119 811	3	32	(28)	5	9	7	44	100
Puerto R.	5 463	3	27	(23)	8	21	6	35	100
Austria	14 277	7	38	.	9	17	6	23	100
Japan	197 686	7	39	(36)	7	17	7	23	100
Italy	92 704	9	35	(32)	8	14	6	28	100

\*The relatively high shares, i.e. 6% and more of agriculture in total GDP reflect special circumstances, i.e. Denmark (7%), Australia (6%) who are exporters of agricultural products; Finland (12%) who has important forestry and fisheries, etc.

Appendix Table I.7 cont'd

Countries	GDP Total	Agriculture, Forestry and Fisheries	Industry: Mining Manufactures, Electricity, Gas and Water Supply	(Manufacturing)	Construction	Trade, Wholesale and Retail	Transportation	Other	Total
Mill.US\$ P e r c e n t a g e D i s t r i b u t i o n									
b) 1970 per capita GDP between \$1,100 and \$250.									
Venezuela*	10 997	8	37	(17)	4	11	11	29	100
S.Africa*	17 357	9	37	(24)	4	14	9	27	100
Panama	1 046	23	17	(15)	6	9	4	41	100
Chile*	6 691	7	41	(28)	4	20	5	23	100
Jamaica	1 284	9	28	(12)	11	15	7	30	100
Mexico	33 496	11	29	(23)	5	33	3	19	100
S.Arabia*	5 094	4	65	(9)	4	5	6	16	100
C.Rica	946	23	21	.	5	17	4	30	100
Nicaragua	845	24	21	(19)	3	20	5	27	100
Iran*	11 671	18	35	.	5	7	5	30	100
Colombia	8 463	27	22	(19)	5	17	7	22	100
Iraq*	3 637	17	39	(9)	3	8	5	28	100
Malaysia	3 239	32	22	(14)	4	14	4	24	100
Guatemala	1 904	29	16	(15)	2	28	4	21	100
Dom.Rep.	1 472	23	21	(19)	5	16	8	27	100
Turkey	12 721	28	22	(19)	7	11	8	24	100
Peru	4 514	19	30	(20)	5		46		100
El Salv.	1 716	28	21	(19)	3	23	5	20	100
Liberia	417	19	33	(5)	4	17	6	21	100
Syria	1 684	21	20	(16)	3	18	10	28	100
Korea, Rep.	8 281	28	25	(22)	6	16	6	19	100
Philipp.	9 538	30	18	(16)	2	8	2	40	100
Ghana	2 214	48	14	(11)	4	12	4	18	100
Paraguay	595	32	18	(17)	3	24	4	19	100

\*The relatively low shares of agriculture and the relatively high shares of industry are explained by the fact that the latter includes mining.

Appendix Table I,7 cont'd

Countries	GDP Total	Agriculture, Forestry and Fisheries	Industry: Mining Manufactures, Electricity, Gas and Water Supply	(Manufacturing)	Construction	Trade, Wholesale and Retail	Transportation	Other	Total
Mill.US\$ P e r c e n t a g e D i s t r i b u t i o n									
c) 1970 per capita GDP below \$250.									
Egypt	7211	25	21	(18)			54		100
Bolivia*	1017	16	30	(14)	4	13	8		100
Pakistan	10485	33	17	(15)	4	14	6	26	100
Thailand	6536	29	19	(16)	6	23	6	17	100
Sri Lanka	2172	33	10	(9)	6	16	9	26	100
Kenya	1611	31	13	(11)	5	10	7	34	100
Nigeria	7711	44	16	(7)	5	12	3	20	100
Uganda	1323	49	11	(8)	2	10	3	25	100
Togo	264	43	19	(11)	3	19	7	9	100
Zaire*	2838	26	27	(12)	3	24	7	13	100
Cent. Af. Rep.	104	31	18	(13)	4	20	3	24	100
Sudan	1832	35	12	(10)	4	18	8	23	100
Indonesia	12224	47	15	(9)	3	19	3	13	100
Haiti	500	50	13	(10)	2	10	2	23	100
Tanzania	1284	37	11	(9)	4	12	8	28	100
India	53117	44	14	(12)	5	9	5	23	100
Burma	2267	34	10	(9)	2	29	7	18	100
Niger	298	51	7	(6)	3	15	3	21	100
Malawi	326	51	13	(12)	4	10	4	18	100
Ethiopia	1777	52	9	(8)	4	8	4	23	100
Upper Volta	347	44	10	(10)	2	16	5	23	100

\*The relatively low shares of agriculture and the relatively high shares of industry are explained by the fact that the latter includes mining.

Appendix Table I.8

Per Capita GDP and Investment Coefficient, 1970 and 1960\*  
(Cross Section Analysis) - Market Economies

All data in current prices.

Countries ranked by size of GDP	GDP per capita		Share of GFCF in GDP	
	1970	1960	1970	1960
	\$	\$	%	%
a) Rich and super rich, with 1970 per capita GDP \$1,700 and more				
U.S.A.	4799	2817	17	17
Sweden	4094	1861	22	21
Kuweit	3995	.	14	12
Canada	3885	2229	21	22
Denmark	3159	1299	22	19
F.R.G.	3095	1323	26	24
Australia	2923	1586	27	25
Norway	2864	1272	27	28
France	2851	1336	26	20
Belgium	2664	1232	22	19
Netherlands	2431	971	26	24
Finland	2251	1116	26	25
New Zealand	2213	1559	23	23
U.K.	2163	1368	19	16
Austria	1932	891	26	25
Lybia	1919	472	18	.
Japan	1895	458	35	30
Israel	1859	939	26	25
Italy	1731	633	21	22

\*The Investment Coefficient is defined as Share of Gross Fixed Capital Formation in GDP.



Appendix Table I.8 cont'd

Countries ranked by size of GDP	GDP per capita		Share of GFCF in GDP	
	1970	1960	1970	1960
	\$	\$	%	%
b) 1970 Per Capita GDP between \$1,100 and \$250				
Argentina	1078	623	20	21
Venezuela	1056	1043	22	19
Spain	957	341	21	19
Uruguay	837	620	11	15
South Africa	773	449	27*	20
Panama	731	392	24a)	15
Portugal	706	281	18	18
Chile	689	294	15	15
Jamaica	687	410	25a)	21
Mexico	682	334	20	17
Saudi Arabia	658	323	13	14
Costa Rica	544	370	22	19
Nicaragua	455	254	15	12
Iran	407	203	19	17
Colombia	401	253	20	18
Brazil	400	208	19c)	17
Iraq	385	245	14	20
Malaysia	369	278	16	11
Guatemala	367	274	13	10
Dom. Republic	363	238	17	10
Turkey	361	259	19	15
Peru	332	208	12	17
El Salvador	300	231	12	14
Rhodesia	285	217	16	22
Ecuador	282	216	20	13
Tunesia	277	205	20	18
Honduras	276	203	19	13
Liberia	275	223	19	.
Syria	269	209	15	13
Korea, Republic	267	152	25b)	11
Philippines	259	164	18	12
Ghana	256	198	12	20
Paraguay	249	159	15	.

\* = Reflects investments in mining sector, etc.

a) = Reflects spreading of U.S. investments

b) = Reflects Japan model of development

c) = National Accounts Summary, World Bank Report, March 1973

Appendix Table I.8 cont'd

Countries ranked by size of GDP	GDP per capita		Share of GFCF in GDP	
	1970	1960	1970	1960
	\$	\$	%	%

c) Low Level Developing Countries, 1970 per capita GDP less than \$250

Morocco	229	154	15	10
Senegal	217	190	10	.
Egypt	216	129	11	15
Bolivia	206	99	14	14
Pakistan	196	83	14	12
Thailand	190	97	24 a)	14
Cameroun	187	127	14	11
Sierra Leone	177	140	16	.
Sri Lanka	174	142	19	15
Kenya	143	101	20	12
Nigeria	140	79	16	13
Uganda	135	94	12	15
Togo	134	84	13	9
Zaire	132	91	16	12
Cent.African Rep.	127	.	14	.
Sudan	117	94	11	11
Indonesia	107	71	14	8
Haiti	103	73	7	14
Tanzania	100	56	20	11
India	98	74	15	13
Burma	82	66	10**	9
Niger	74	69	6*	.
Chad	74	67	11****	.
Malawi	73	42	18	9
Ethiopia	72	49	12	12
Burundi	71	47	6***	6
Upper Volta	65	42	8**	.
Mali	53	67	13*	.

\* = 1969  
 \*\* = 1968  
 \*\*\* = 1965  
 \*\*\*\* = 1963

a) = reflects U.S. investments

Appendix Table I.9. U.K.Yield on Consols [Consolidated Government Obligations], 1850-1975

Year	Average yield %	Year	Average yield %	Year	Average yield %	Year	Average yield %	Year	Average yield %
1850	3.1	1880	3.1	1910	3.1	1940	3.4	1970	9.16
1	3.1	1	3.0	1	3.2	1	3.1	1	9.05
2	3.0	2	3.0	2	3.3	2	3.0	2	9.11
3	3.1	3	3.0	3	3.4	3	3.1	3	10.85
4	3.3	4	3.0	4	3.3	4	3.1	4	14.95
5	3.3	5	3.0	5	3.8	5	2.9	5	14.66
6	3.2	6	3.0	6	4.3	6	2.6		
7	3.3	7	3.0	7	4.6	7	2.8		
8	3.1	8	3.0	8	4.4	8	3.2		
9	3.2	9	2.8	9	4.6	9	3.3		
1860	3.2	1890	2.9	1920	5.3	1950	3.54		
1	3.3	1	2.9	1	5.2	1	3.78		
2	3.2	2	2.8	2	4.4	2	4.23		
3	3.2	3	2.8	3	4.3	3	4.08		
4	3.3	4	2.7	4	4.4	4	3.75		
5	3.4	5	2.6	5	4.4	5	4.17		
6	3.4	6	2.5	6	4.6	6	4.73		
7	3.2	7	2.5	7	4.6	7	4.98		
8	3.2	8	2.5	8	4.5	8	4.98		
9	3.2	9	2.6	9	4.6	9	4.82		
1870	3.2	1900	2.8	1930	4.5	1960	5.47		
1	3.2	1	2.9	1	4.4	1	6.21		
2	3.2	2	2.9	2	3.7	2	5.94		
3	3.2	3	2.8	3	3.4	3	5.58		
4	3.2	4	2.8	4	3.1	4	6.03		
5	3.2	5	2.8	5	2.5	5	6.42		
6	3.2	6	2.8	6	2.9	6	6.80		
7	3.1	7	3.0	7	3.3	7	6.69		
8	3.2	8	2.9	8	3.4	8	7.39		
9	3.1	9	3.0	9	3.7	9	8.88		
1880	3.1	1910	3.1	1940	3.4	1970	9.16		

Sources: B.R.Mitchell  
and Phyllis Deane.  
Abstract of British  
Statistics, Cambridge  
University Press 1971  
p.456 and U.K. Annual  
Abstract of Statistics

Appendix Table I.10. Germany: Interest Paid on Government Obligations  
(Communal) 1850-1913

Year	Yield %	Year	Yield %	Year	Yield %
1850	3.80	1880	3.89	1910	3.98
1	3.82	1	3.84	1	4.03
2	3.75	2	3.83	2	4.04
3	3.72	3	3.88	3	4.07
4	3.74	4	3.90		
5	3.82	5	3.93		
6	3.88	6	4.00		
7	3.93	7	3.98		
8	4.09	8	3.93		
9	4.19	9	3.91		
1860	4.23	1890	3.89		
1	4.25	1	3.86		
2	4.31	2	3.91		
3	4.26	3	3.92		
4	4.16	4	3.92		
5	4.10	5	3.90		
6	4.09	6	3.85		
7	4.09	7	3.79		
8	4.03	8	3.77		
9	3.94	9	3.72		
1870	4.00	1900	3.69		
1	4.11	1	3.69		
2	4.15	2	3.71		
3	4.20	3	3.70		
4	4.31	4	3.71		
5	4.27	5	3.75		
6	4.14	6	3.79		
7	4.05	7	3.82		
8	3.96	8	3.88		
9	3.94	9	3.95		
1880	3.89	1910	3.98		

Source:

Germany. Interest paid on Government Obligations, see: Die Verzinsung der Öffentlichen Schulden 1850-1913; in W. Hoffmann, Grumbach, Hesse. Das Wachstum der Deutschen Wirtschaft seit der Mitte des 19. Jahrhunderts, Heidelberg, 1965, p. 798.

Appendix Table I.11  
Bank and Primary Rates, U.K., Germany/F.R.G., U.S.A., 1870-1975

Year	U.K. Bank Rate		Germany, Bank Discount Annual Average	USA Prime Rate Comm. Paper 4-6 months	
	%	%	%	%	%
1870	3.0	2.5	.	.	5.71
1	2.5	3.0	.	.	5.40
2	3.0	5.0	.	.	5.81
3	6.0	5.5	.	.	6.10
4	2.5	6.0	.	.	5.14
1875	3.0	4.0	.	.	5.18
6	2.0	2.0	4.16	.	6.25
7	3.0	4.0	4.42	.	6.66
8	3.0	5.0	4.34	.	5.00
9	2.0	3.0	3.70	.	4.67
1880	2.5	3.0	4.24	.	5.72
1	2.5	5.0	4.42	.	4.75
2	3.0	5.0	4.52	.	5.41
3	4.0	3.0	4.05	.	6.30
4	2.0	5.0	4.00	.	5.47
1885	2.0	4.0	4.12	.	4.01
6	2.5	5.0	3.28	.	3.84
7	2.0	4.0	3.41	.	5.07
8	2.5	5.0	3.32	.	6.02
9	2.5	6.0	3.68	.	5.37
1890	4.0	5.0	4.52	.	7.50
1	3.0	3.5	3.78	6.91	6.62
2	2.0	3.0	3.20	5.40	4.53
3	2.5	3.0	4.07	7.64	5.07
4	2.0	2.0	3.12	5.22	3.98
1895	2.0	2.0	3.14	5.80	4.02
6	2.0	4.0	3.66	7.02	4.34
7	2.0	3.0	3.81	4.72	4.11
8	2.5	4.0	4.27	5.34	4.85
9	3.0	6.0	5.04	5.50	5.85
1900	3.0	4.0	5.33	5.71	3.59
1900	3.0	4.0	5.33	.	5.33
1	3.0	4.0	4.10	.	4.10
2	3.0	4.0	3.32	.	3.32
3	3.0	4.0	3.84	.	3.84
4	3.0	3.0	4.22	.	4.22
1905	2.5	4.0	3.82	.	3.82
6	3.0	6.0	5.15	.	5.15
7	4.0	7.0	6.03	.	6.03
8	2.5	2.5	4.76	.	4.76
9	2.5	4.5	3.93	.	3.93
1910	3.0	4.5	4.35	.	4.35
1	3.0	4.0	4.40	.	4.40
2	3.0	5.0	4.95	.	4.95
3	4.5	5.0	5.89	.	5.89
4	3.0	5.0*	.	.	5.47
1915	5.0	5.0	.	.	4.01
6	5.0	6.0	.	.	3.84
7	5.0	5.0	.	.	5.07
8	5.0	5.0	.	.	6.02
9	5.0	6.0	.	.	5.37
1920	7.0	7.0	.	.	7.50
1	6.0	5.0	.	.	6.62
2	3.0	3.0	.	.	4.53
3	3.0	4.0	.	.	5.07
4	4.0	5.0	.	.	3.98
1925	5.0	5.0	9.15	.	4.02
6	5.0	5.0	6.74	.	4.34
7	4.5	4.5	5.83	.	4.11
8	4.5	4.5	7.00	.	4.85
9	5.5	5.0	7.11	.	5.85
1930	3.0	3.0	4.93	.	3.59

\*On 1 August 1914 the UK Bank Rate rose to 10.0%.

Year	U.K. Bank Rate		Germany, Bank Discount Annual Average		USA Prime Rate Comm. Paper 4-6 months	
	Mid Year	End Year				
	%	%	%	%	%	%
1930	3.0	3.0	4.93		3.59	
1	2.5	6.0	6.91		2.64	
2	2.0	2.0	5.21		2.73	
3	2.0	2.0	4.00		1.73	
4	2.0	2.0	4.00		1.02	
1935	2.0	2.0	4.00		.75	
6	2.0	2.0	4.00		.75	
7	2.0	2.0	4.00		.94	
8	2.0	2.0	4.00		.81	
9	2.0	2.0	.		.59	
1940	2.0	2.0	.		.56	
1	2.0	2.0	.		.53	
2	2.0	2.0	.		.66	
3	2.0	2.0	.		.69	
4	2.0	2.0	.		.73	
1945	2.0	2.0	.		.75	
6	2.0	2.0	.		.81	
7	2.0	2.0	.		1.03	
8	2.0	2.0	4.27		1.44	
9	2.0	2.0	4.47		1.49	
1950	2.0	2.0	4.36		1.45	
1	2.0	2.50	6.00		2.16	
2	4.00	4.00	5.23		2.33	
3	3.50	3.50	3.73		2.52	
4	3.00	3.00	3.19		1.58	
1955	4.50	4.50	3.20		2.18	
6	5.50	5.50	4.71		3.31	
7	5.00	7.00	4.41		3.81	
8	5.50	4.00	3.30		2.46	
9	4.00	4.00	3.00		3.97	
1960	6.00	5.00	4.41		3.85	
1960	6.00	5.00	4.41		3.85	
1	7.00	6.00	3.20		2.97	
2	5.00	4.50	3.00		3.26	
3	4.00	4.00	3.00		3.55	
4	5.00	7.00	3.00		3.97	
1965	6.00	6.00	3.70		4.38	
6	7.00	7.00	4.58		5.55	
7	5.50	8.00	3.35		5.10	
8	7.50	7.0	3.00		5.90	
9	8.00	8.0	4.50		7.83	
1970	7.00	7.0	6.88		7.72	
1	6.00	5.0	5.13		5.11	
2	6.00	9.0	3.39		4.69	
3	11.50	13.0	6.23		8.15	
4	.	11.50	6.91		9.84	
1975	.	11.25	4.50		6.32	
1976 (selected months)						
March	9.00				5.37	
July	11.50			3.5	5.67	
Sept.	13.00			3.5	5.45	
Oct.	15.00			3.5	5.22	
Nov.	14.75			3.5	.	
Dec.	14.50			3.5	.	
1977						
March	11.00					

Appendix Table I.11.    S o u r c e s

United Kingdom.    Rate of the Bank of England. For 1870-1939, compiled from "Changes in bank rate, 1797-1939" in R.Mitchell and Phyllis Deane Abstract of British Historical Statistics, op.cit.p.546; updated with U.K.Statistical Abstract and IMF International Financial Statistics.

Germany/FRG. Bank discount [Diskont] of the Germany Central bank later Reichsbank and Bundesbank. For 1870-1971, annual averages from Statistische Bundesamt Bevölkerung und Wirtschaft 1872-1972, Chapter XV Geld und Kredit, table 7, p.215; updated by weighted annual averages compiled from changes in the "Diskont" of the Bundesbank published in the Deutsche Bundesbank Monatsberichte.

U.S.A. Open market rate in New York City for prime commercial paper, 4-6 months. 1870-1969 from Historical Statistics of the United States from Colonial Times to 1970; updated with U.S. Statistical Abstract and Survey of Current Business.





C.II. CAPITAL STOCK



Appendix Table II.1. The Growth of Capital Stock, total and per capita in constant prices of 1912/13, in Germany/FRG and U.S.A., 1850-1974 (selected years)

Years	Total Capital Stock in constant prices of		Per Capita Capital Stock in constant prices of		Population	
	1913	1912	1913	1912		
	Germany	USA	Germany	USA	Germany	USA
	Billion \$ <sup>a)</sup>	Billion \$	\$ <sup>a)</sup>	\$	Million	Million
Germany:						
1850	11.7	4.6 <sup>1)</sup>	331	197 <sup>1)</sup>	35.3	23.3
1860	13.9	.	371	.	37.6	.
1870	17.8	.	436	.	40.8	.
1880	23.5	23.3	521	463	45.1	50.3
1890	30.7	45.6	623	723	49.2	63.1
1900	42.3	56.9	756	747	56.0	76.1
1910	57.8	.	896	.	64.6	.
1912	.	89.8	.	942	.	95.3
1913	64.0	.	955	.	67.0	.
1922	.	111.0	.	1008	.	110.1
1925	58.0	.	930	.	62.4	.
1929	.	149.2	.	1225	.	121.8
1930	64.2	.	999	.	64.3	.
1933	.	147.6	.	1175	.	125.6
1935	66.5	.	995	.	66.9	.
1938	74.1	.	1116	.	66.4	.
1939	.	149.3	.	1141	.	130.9
F.R.G.:						
1950	37.5	199.2	740	1308	50.6	152.3
1952	40.0	215.7	775	1369	51.6	157.6
1960	64.8	288.3	1166	1595	55.6	180.7
1965	88.0	350.9	1490	1806	59.0	194.3
1968	104.3	399.1	1734	1989	60.2	200.7
1970	115.3	.	1901	.	60.7	204.9
1971	122.0	.	1990	.	61.3	207.0
1972	128.8	.	2088	.	61.7	208.8
1973	135.8	.	2191	.	62.0	210.4
1974	.	.	.	.	62.1	211.9

Source and methods see Appendix Tables II.3 and II.6.

1) = Data may be incomplete

a) = At 1913 Exchange Rates, 1 Mark = 4 US-\$

Appendix Table II.2. Capital Stock by Broad Economic Sectors, 1850-1974 (selected years)  
Germany, F.R.G. and U.S.A.

	Germany, F. R. G					U. S. A.							
Year	Total Values in prices of 1913		Structures and Equipment				Total Values in current prices	Structures only				Total	
			Agri- cul- ture	Indust. Trade Services	Dwelling	Government		Agri- cul- ture	Indust. Trade Services	Residen- tial	Institu- tional		Government
	Billion Mark	P e r c e n t a g e s					Billion \$	P e r c e n t a g e s					
1850	46.77	52*	15	15*	18	100	2.7	25.9	40.7	29.6	3.7	100	
1860	55.73	49*	16	16*	19	100	.	.	.	.	.	100	
1870	71.17	44*	16	19*	21	100	.	.	.	.	.	100	
1880	93.97	37*	17	22*	24	100	13.3	15.0	43.6	36.8	4.5	100	
1890	122.68	31*	23	24*	22	100	25.0	10.8	41.2	43.2	4.8	100	
1900	169.37	25*	29	25*	21	100	35.0	9.4	36.8	44.9	3.1	100	
1910	231.30	21*	32	26*	21	100	.	.	.	.	.	100	
1912	.	.	.	.	.	.	62.4	9.0	37.6	40.7	3.2	100	
1913	255.94	21*	33	26*	20	100	.	.	.	.	.	.	
1922	.	.	.	.	.	.	134.5	9.2	34.2	42.1	3.0	100	
1925	232.19	19*	33	28*	20	100	.	.	.	.	.	100	
1929	.	.	.	.	.	100	189.8	6.4	31.0	47.2	3.0	100	
1930	256.96	19*	34	27*	20	100	.	.	.	.	.	100	
1933	.	.	.	.	.	100	159.4	5.5	31.4	43.7	3.0	100	
1935	266.13	19*	33	27*	21	100	.	.	.	.	.	.	
1938	296.56	18*	35	26*	21	100	.	.	.	.	.	.	
1939	.	.	.	.	.	.	188.6	4.8	28.7	45.7	2.9	100	
1950	FRG Billion Mark (1913 Prices)					100	.	.	.	.	.	.	
	173.89	17*	40	23*	20	100	.	.	.	.	.	.	
1950	FRG Billion DM (1962 Prices)					100	.	.	.	.	.	.	
	612	9	40	32	19	100	.	.	.	.	.	.	
1952	653	8	40	33	19	100	576.3	5.1	20.1	47.0	2.6	100	
1960	1047	7	43	33	17	100	924.5	4.2	19.0	46.8	2.9	100	
1965	1435	6	46	31	17	100	1233.6	3.5	18.2	45.6	3.4	100	
1968	1698	6	47	30	17	100	1536.9	3.6	18.8	44.4	3.3	100	
1970	1881	6	48	29	17	100	.	.	.	.	.	.	
1972	2103	5	49	29	17	100	.	.	.	.	.	.	
1974	2333	5	50	28	17	100	.	.	.	.	.	.	

Sources, notes see Appendix Tables \*Rural dwellings included with agriculture

Appendix Table II.3. Germany and F.R.G. Gross Capital Stock, Population and Prices, 1850-1975

Years	C a p i t a l S t o c k			Popula- tion	D e f l a t o r s		Capital Stock in 1913 Prices, and 1913 Exchange Rates*	
	current prices	in 1913 prices	1962 prices		1913=100	1962=100	Total per Capita	\$
	Billion Mark	Billion Mark		1000			Billion \$	
Germany:								
1850	32.40	46.77	.	35303	69.3	.	11.69	331
1860	43.70	55.73	.	37609	78.4	.	13.93	371
1870	56.80	71.17	.	40804	79.8	.	17.79	436
1880	67.80	93.97	.	45093	72.2	.	23.49	521
1890	102.20	122.68	.	49239	83.3	.	30.67	623
1900	157.20	169.37	.	56046	92.8	.	42.34	756
1910	213.60	231.30	.	64568	92.3	.	57.83	896
1913	255.94	255.94	.	66978	100.0	.	63.99	955
1925	362.40	232.19	.	62411	156.1	.	58.05	930
1930	403.70	256.96	.	64294	157.1	.	64.24	999
1935	327.50	266.13	.	66871	123.1	.	66.53	995
1938	373.10	296.50	.	66424	125.8	.	74.13	1116
F.R.G.:								
Hist. Series	Bill.DM	Bill.DM	Bill.DM					
1950	402.0	150	.	.	268	65.6	37.5	741
Current Ser. 1950	401.4	150	612	50601	268	74.7	38.8	758
1951	472.1	155	632	51194	305	79.8	40.0	775
1952	521.1	160	653	51603	325	77.8	41.5	795
1953	525.9	166	676	52196	317	77.3	43.3	822
1954	545.7	173	706	52685	315	80.1	45.3	852
1955	592.7	181	740	53174	327	82.7	48.0	906
1956	648.3	192	784	53008	337	84.9	51.0	950
1957	706.3	204	832	53656	346	86.9	54.0	993
1958	765.0	216	881	54373	354	89.8	57.0	1036
1959	836.0	228	931	55015	366	91.9	64.8	1166
1960	963.1	259	1048	55577	372	96.1	68.3	1216
1961	1070.1	273	1114	56173	392	100.0	72.8	1278
1962	1189.0	291	1189	56974	408	100.1	77.8	1349
1963	1268.0	311	1267	57606	408	105.9	82.5	1415
1964	1425.0	330	1346	58290	432	109.7	88.0	1490
1965	1574.0	352	1435	59041	447	113.7	93.5	1567
1966	1736.0	374	1527	59676	464	115.0	99.3	1659
1967	1861.8	397	1619	59872	469	116.8	104.3	1734
1968	1983.2	417	1698	60165	476	120.8	109.3	1796
1969	2155.0	437	1784	60842	493	129.5	115.3	1901
1970	2435.9	461	1881	60651c	528	138.7	122.0	1990
1971	2760.1	488	1950	61302	566	144.4	128.8	2088
1972	3036.7	515	2103	61672	590	151.2	135.0	2191
1973	3353.6	543	2213	61976	613	161.3	.	.
1974	3771.2	.	2333	62054	659	166.0	.	.
1975	4035.5	.	2431	61800	.	.	.	.

\*4 Mark = 1 US-Dollar; c = Census data

Appendix Table II.3. Germany and F.R.G. Gross Capital Stock,  
Population and Prices, 1850-1974

Capital stock [Brutto Anlagevermögen, Neuwert].

1850-1950 Historical Series. Data include structures, equipment and inventories, compiled from: W.G.Hoffmann, Grumbach et al, op.cit., p.225, table 40 (current prices) and p.253, table 39 (constant prices of 1913). Data relate to Germany, Reich.

Note: Data are available at source for all individual years 1850-1913; 1925-1938.

1950-1974 Current series. Data include only structures and equipment, compiled from: Wirtschaft und Statistik 1971/10, p.608 and Statistisches Jahrbuch 1975, p.521. Data relate to F.R.G. including Saar and W.Berlin from 1960 on.

Deflators.

Historical Series, 1850-1938: The deflators are implicit in the Grumbach Hesse series on capital stock in current and 1913 prices.  
Current series 1950-1974: The deflators are for capital formation, see IIASA Working Paper WP-76-19, pp.9-11 and p.22.

Appendix Table II.4.

Germany and F.R.G. Gross Capital Stock by Major Sectors  
of the Economy, 1850-1975

Years	Total	Industry, Trade, Services	Agriculture	Dwellings	Government	Total	Industry, Trade, Services	Agriculture	Dwellings	Government
Billion Marks (1913 Prices)						In Percents				
	Germany					Germany				
1850	46.77	7.16	24.49*	6.98*	8.14	100	15	52*	15*	18
1860	55.73	8.65	27.52*	8.88*	10.68	100	16	49*	16*	19
1870	71.17	11.70	31.42*	13.40*	14.65	100	16	44*	19*	21
1880	93.97	16.05	34.63*	20.98*	22.31	100	17	37*	22*	24
1890	122.68	28.30	38.34*	28.84*	27.20	100	23	31*	24*	22
1900	169.37	49.80	42.86*	42.38*	34.33	100	29	25*	25*	21
1910	231.30	74.30	49.61*	61.27*	46.12	100	32	21*	26*	21
1913	255.94	85.20	53.21*	66.86*	50.67	100	33	21*	26*	20
1925	232.19	76.63	45.10*	62.95*	47.51	100	33	19*	28*	20
1930	256.96	86.70	48.58*	69.22*	52.46	100	34	19*	27*	20
1935	266.13	86.62	50.04*	73.00*	56.47	100	33	19*	27*	21
1938	296.56	103.22	53.54*	77.04*	62.76	100	35	18*	26*	21
Hist.Series	F.R.G.	Billion Marks (1913 Prices)				F.R.G.				
1950	173.89	69.54	30.40*	39.70*	34.25	100	40	17*	23*	20
Current Ser.	F.R.G.	Billion D-Marks (1962 Prices)								
1950	612	244	54	199	115	100	40	9	32	19
1951	632	253	55	206	118	100	40	9	32	19
1952	653	263	55	214	121	100	40	8	33	19
1953	677	272	57	224	124	100	40	8	33	19
1954	706	285	58	235	128	100	40	8	33	19
1955	740	302	59	247	132	100	41	8	33	18
1956	784	324	61	261	138	100	41	8	33	18
1957	832	349	63	276	144	100	42	8	33	17
1958	881	374	65	291	151	100	42	8	33	17
1959	930	398	68	307	157	100	43	7	33	17
1960	1047	453	72	348	174	100	43	7	33	17
1961	1115	491	75	365	184	100	43	7	33	17
1962	1189	531	79	384	195	100	45	7	32	16
1963	1267	574	83	403	207	100	45	7	32	16
1964	1346	616	86	422	222	100	46	6	32	16
1965	1435	664	90	443	238	100	46	6	31	17
1966	1527	711	94	466	256	100	47	6	31	16
1967	1619	759	98	489	273	100	47	6	30	17
1968	1698	798	100	511	289	100	47	6	30	17
1969	1784	843	102	533	306	100	47	6	30	17
1970	1881	898	105	554	324	100	48	6	29	17
1971	1990	962	108	576	344	100	49	5	29	17
1972	2103	1030	109	600	364	100	49	5	29	17
1973	2218	1098	110	628	382	100	50	5	28	17
1974	2333	1164	112	657	400	100	50	5	28	17
1975	2431	1218	113	680	420	100	50	5	28	17

Appendix Table II.4.    Germany and F.R.G. Gross Capital Stock,  
by Sectors of the Economy

1850-1950    Historical series

    \*    = Rural dwellings included with agriculture,  
          and not with dwelling

Sources, etc.    See Appendix Table 1.

1950-1975    Current series

Industry, Trade and Services includes private, non-profit making enterprises, amounting to little over 1% of total capital stock.

Railroads and other public, government operated transportation seem to be included with services.



Appendix Table II.5: F.R.G. Capital Stock by 19 Activities, 1950-1972, in 1962 Prices

		1. Agriculture	2. Energy	3. Mining, excl. Fuel	Manufacturing								Percentage Distribution							16 Transportation	17. Dwelling	18. Government	19. Other
	Total				4. Quarrying	5. Food	6. Textiles	7. Clothing	8. Wood, Paper	9. Chemicals	10. Basic Metals	11. Metal Products	12. Vehicles	13. Machinery	14. Construction	15. Trade							
Year	Billion D-Mark	Percentage Distribution																					
1950	421.4	10.0	9.8	.4	1.2	3.2	1.7	.3	2.2	2.2	3.0	.9	.5	3.4	.8	4.4	12.5	33.0	7.7	2.9			
1951	439.4	9.7	9.7	.4	1.2	3.1	1.7	.3	2.1	2.2	3.0	.9	.6	3.4	.8	4.5	12.1	33.2	8.0	3.0			
1952	460.9	9.4	9.7	.4	1.2	3.1	1.7	.3	2.1	2.2	3.0	1.0	.6	3.4	.9	4.5	11.8	33.3	8.3	3.1			
1953	487.8	9.1	9.7	.4	1.2	3.0	1.6	.3	2.1	2.2	3.0	1.0	.6	3.4	.9	4.6	11.6	33.4	8.6	3.3			
1954	520.2	8.8	9.8	.3	1.2	2.9	1.6	.3	2.0	2.3	3.1	1.0	.7	3.4	1.0	4.6	11.3	33.4	8.9	3.3			
1955	562.1	8.5	9.9	.3	1.2	2.8	1.5	.3	2.0	2.3	3.2	1.1	.7	3.4	1.1	4.6	11.0	33.2	9.2	3.5			
1956	608.0	8.3	9.9	.3	1.2	2.8	1.5	.3	2.0	2.4	3.2	1.1	.7	3.4	1.2	4.7	10.8	33.0	9.6	3.6			
1957	653.9	8.1	9.9	.3	1.2	2.7	1.4	.3	1.9	2.5	3.3	1.2	.8	3.4	1.3	4.8	10.6	32.6	9.9	3.8			
1958	701.0	7.9	9.9	.3	1.2	2.6	1.4	.3	1.9	2.6	3.3	1.2	.8	3.4	1.4	5.0	10.5	32.3	10.1	4.0			
1959	754.3	7.8	9.8	.3	1.2	2.5	1.4	.3	1.8	2.6	3.3	1.3	.8	3.4	1.5	5.2	10.3	31.8	10.5	4.2			
1960	817.8	7.7	9.7	.3	1.2	2.5	1.4	.3	1.8	2.7	3.3	1.3	.8	3.4	1.7	5.4	10.0	31.2	10.8	4.4			
1961	886.9	7.6	9.7	.3	1.2	2.4	1.3	.4	1.8	2.8	3.3	1.4	.8	3.4	1.9	5.6	9.8	30.7	11.2	4.6			
1962	958.4	7.4	9.6	.3	1.1	2.4	1.3	.4	1.7	2.8	3.3	1.4	.8	3.4	2.1	5.7	9.6	30.1	11.7	4.7			
1963	1029.6	7.2	9.6	.3	1.1	2.3	1.3	.4	1.7	2.9	3.4	1.5	.9	3.4	2.2	5.8	9.4	29.7	12.2	4.9			
1964	1111.6	7.1	9.5	.3	1.1	2.3	1.3	.4	1.7	2.9	3.3	1.5	.9	3.4	2.4	5.8	9.1	29.2	12.7	5.2			
1965	1195.4	6.9	9.5	.3	1.1	2.2	1.2	.4	1.6	2.9	3.3	1.5	.9	3.4	2.5	5.9	8.8	28.8	13.2	5.5			
1966	1276.7	6.9	9.5	.3	1.1	2.2	1.2	.4	1.6	3.0	3.3	1.6	.9	3.4	2.5	5.9	8.5	28.5	13.6	5.8			
1967	1345.5	6.8	9.5	.3	1.1	2.1	1.2	.4	1.6	3.0	3.3	1.6	.9	3.4	2.6	5.9	8.2	28.3	13.9	6.0			
1968	1422.3	6.7	9.4	.3	1.0	2.1	1.2	.4	1.6	3.0	3.3	1.6	.9	3.4	2.6	6.0	7.9	28.1	14.3	6.3			
1969	1509.8	6.6	9.4	.3	1.0	2.0	1.2	.4	1.5	3.0	3.3	1.6	.9	3.3	2.6	6.0	7.6	27.8	14.7	6.5			
1970	1608.0	6.5	9.4	.3	1.0	2.0	1.1	.4	1.5	3.1	3.3	1.7	.9	3.3	2.7	6.0	7.3	27.6	15.0	6.7			
1971	1707.1	6.5	9.4	.3	1.0	1.9	1.1	.4	1.5	3.1	3.3	1.7	.9	3.3	2.7	6.0	7.1	27.4	15.4	7.0			
1972	1809.5	6.4	9.4	.3	1.0	1.9	1.1	.4	1.5	3.1	3.3	1.7	.9	3.3	2.7	6.0	6.9	27.2	15.8	7.2			

Source: Data compiled by Pestel Team, Hannover, May 1976

Appendix Table II.6: U.S. Gross Capital Stock,  
Population and Prices,  
1850-1968

Years	Total Capital Stock (Structures and Equipment) in		Popula- tion	Deflators	Capital Stock in 1912 Prices	
	Current Prices	Constant Prices			Total	Per Capita
	Billion \$	Billion \$	Million	1912=100	Billion \$	\$
		1929 Prices				
1850	3.2 <sup>1</sup>	8.3	23.3	69.9	4.6	197
1880	18.7	42.3	50.3	80.1	23.2	463
1890	35.3	82.7	63.1	77.4	45.6	723
1900	50.3	118.0	76.1	77.2	65.2	857
		1947-49 Prices				
1900	49.5	103.0	76.1	83.5	59.3	779
1912	89.8	162.8	95.3	100.0	89.8	942
1922	196.2	355.1	110.1	180.7	108.6	986
1929	270.4	501.0	121.8	176.5	153.2	1285
1933	214.3	485.5	125.6	144.1	148.7	1184
1939	255.3	490.4	130.9	170.3	149.9	1145
1945	366.4	494.2	132.5	242.2	151.3	1142
1946	463.2	543.1	140.0	279.1	166.0	1186
1947	561.8	566.1	144.7	324.2	173.3	1198
1948	622.3	593.5	147.2	342.8	181.5	1233
1949	634.2	618.0	149.8	335.3	189.1	1262
1950	728.6	651.0	152.3	365.7	199.2	1308
1951	791.5	679.1	154.9	381.0	207.7	1341
1952	838.3	705.1	157.6	388.6	215.7	1369
		1958 Prices				
1952	805.1	899.2	157.6	388.6	207.2	1315
1953	844.8	942.6	160.2	389.0	217.2	1356
1954	886.5	984.2	163.0	391.3	225.5	1383
1955	966.8	1036.6	165.9	404.9	238.8	1439
1956	1058.8	1083.5	168.9	424.4	249.5	1477
1957	1128.0	1126.8	172.0	434.1	259.8	1510
1958	1178.5	1161.2	174.9	434.1	271.5	1552
1959	1241.5	1204.1	177.8	447.7	277.3	1560
1960	1292.6	1251.1	180.7	448.4	288.3	1595
1961	1346.3	1291.4	183.7	452.7	297.4	1619
1962	1417.8	1340.1	186.5	459.3	308.7	1655
1963	1498.2	1393.5	189.2	466.7	321.0	1697
1964	1589.8	1453.5	191.9	474.9	334.8	1745
1965	1702.0	1523.7	194.3	485.0	350.9	1806
1966	1840.6	1598.0	196.6	500.1	368.0	1872
1967	1962.0	1660.9	198.7	513.0	382.5	1925
1968	2147.8	1731.9	200.7	538.2	399.1	1989

<sup>1</sup> = Incomplete data;

Sources: Capital Stock data current and in prices of 1929;  
1947-49 and 1958 compiled from Historical Statistics of the  
United States, from Colonial Times to 1970.

Tables: F349-364; 365-376; 422-445; 446-469; pages 252-256

Deflators: Implicit in above mentioned capital stock.

Appendix Table II.7. U.S. Gross Capital Stock (Business, Government and Households), by Type of Assets, 1850-1968

Data in Current Prices

Year	Total Structures and Equipment	Total Structures	Equipment	
			Producer Durables	Consumer Durables
	Billion \$	Billion \$	Billion \$	Billion \$
1850	3.2 <sup>1)</sup>	2.7 <sup>1)</sup>	0.2	0.3
1880	18.7	13.3	3.0	2.4
1890	35.3	25.0	5.8	4.5
1900	50.3	35.0	9.3	6.0
~~~~~				
1912	89.8	62.4	13.8	13.6
1922	196.2	134.5	30.8	30.9
1929	270.4	189.8	38.4	42.2
1933	214.3	159.4	29.2	25.7
1939	255.3	188.6	34.2	32.5
~~~~~				
1952	805.1	576.3	138.5	90.3
1956	1058.1	752.4	189.1	117.3
1960	1292.7	924.5	227.4	140.8
1965	1701.9	1233.6	285.1	183.2
1968	2147.7	1536.9	377.0	233.8

Sources: 1850-1945: Historical Statistics of the United States, Colonial Times to 1957, p.151, Table F-197-221  
 1952-1968: Historical Statistics of the United States, Colonial Times to 1970, Table F349-376, p.252.

~~~~~ = Change of Estimate

1) = Incomplete Data

Appendix Table II.8. U.S. Gross Capital Stock - Total and Business Economy, 1960 and 1968

|                                         | 1 9 6 0                      |                     | 1 9 6 8                      |                     |
|-----------------------------------------|------------------------------|---------------------|------------------------------|---------------------|
|                                         | Total<br>Economy             | Business<br>Economy | Total<br>Economy             | Business<br>Economy |
|                                         | current prices<br>\$ Billion |                     | current prices<br>\$ Billion |                     |
| Structures:                             |                              |                     |                              |                     |
| Non-Farm                                |                              |                     |                              |                     |
| Government (Public-<br>Non-Residential) | 249.2                        | -                   | 459.8                        | -                   |
| Institutional                           | 27.2                         | .                   | 55.7                         | .                   |
| Private Manufacturing                   | 176.1                        | 70.0                | 288.7                        | 108.3               |
| Other Private, Non-Resid.               |                              | 268.5 (a)           |                              | 442.7 (a)           |
| Residential                             | 433.1                        | -                   | 682.7                        | -                   |
| Farm Structures                         | 38.9                         | 21.4                | 50.0                         | 27.2                |
|                                         | 924.5                        | 359.9               | 1536.9                       | 578.2               |
| Equipment                               |                              |                     |                              |                     |
| Producer Durables                       | 227.4                        |                     | 377.0                        |                     |
| Farm                                    | •                            | 41.3                | •                            | 55.4                |
| Manufacturing                           | •                            | 95.7                | •                            | 154.8               |
| Non-Farm, Non-Mfg.                      | •                            | 190.3               | •                            | 321.3               |
|                                         |                              | 327.3               |                              | 531.5               |
| Consumer Durables                       | 140.8                        | •                   | 233.8                        | •                   |
| Total Equipment                         | 368.2                        | •                   | 610.8                        | •                   |
| Total All Sectors                       | 1292.7                       | •                   | 2147.7                       | •                   |
| Business Sector                         | •                            | 687.2               | •                            | 1109.7              |
| Business Sector as<br>percent of total  | •                            | 53.2%               | •                            | 51.7%               |

(a) = Includes business residential

Sources: Compiled from 1975 U.S. Statistical Abstract, p.411, Table 674 (Total Economy) and Table 675 (Fixed Non-Residential, Business Capital).

Appendix Table II.9.: U.S. Gross Fixed Nonresidential Business Capital Stock, by Major Industry Group  
Current Prices 1925-75  
(Billions of Dollars)

| End of year | Total                                 |                |                 | By major industry group               |                |                 |                                       |                |                 |                                       |                |                 |
|-------------|---------------------------------------|----------------|-----------------|---------------------------------------|----------------|-----------------|---------------------------------------|----------------|-----------------|---------------------------------------|----------------|-----------------|
|             |                                       |                |                 | Farm                                  |                |                 | Manufacturing                         |                |                 | Nonfarm nonmanu-<br>facturing         |                |                 |
|             | Equip-<br>ment and<br>struc-<br>tures | Equip-<br>ment | Struc-<br>tures | Equip-<br>ment and<br>struc-<br>tures | Equip-<br>ment | Struc-<br>tures | Equip-<br>ment and<br>struc-<br>tures | Equip-<br>ment | Struc-<br>tures | Equip-<br>ment and<br>struc-<br>tures | Equip-<br>ment | Struc-<br>tures |
| 1925.....   | 155.7                                 | 54.5           | 101.2           | 14.9                                  | 6.5            | 8.4             | 32.1                                  | 11.6           | 20.5            | 108.7                                 | 36.4           | 72.3            |
| 1926.....   | 159.4                                 | 56.5           | 103.0           | 15.0                                  | 6.7            | 8.3             | 33.0                                  | 12.1           | 20.9            | 111.5                                 | 37.7           | 73.8            |
| 1927.....   | 162.5                                 | 57.9           | 104.6           | 15.0                                  | 6.8            | 8.2             | 33.7                                  | 12.4           | 21.2            | 113.8                                 | 38.6           | 75.2            |
| 1928.....   | 165.9                                 | 60.0           | 105.9           | 15.2                                  | 7.2            | 8.0             | 34.9                                  | 13.1           | 21.7            | 115.8                                 | 39.7           | 76.1            |
| 1929.....   | 166.4                                 | 61.5           | 104.9           | 15.1                                  | 7.4            | 7.6             | 35.3                                  | 13.5           | 21.8            | 116.1                                 | 40.6           | 75.5            |
| 1930.....   | 159.4                                 | 59.4           | 100.0           | 14.2                                  | 7.4            | 6.8             | 32.8                                  | 12.8           | 20.0            | 112.4                                 | 39.1           | 73.2            |
| 1931.....   | 145.6                                 | 55.7           | 90.0            | 12.9                                  | 7.2            | 5.7             | 28.9                                  | 11.8           | 17.1            | 103.9                                 | 36.7           | 67.2            |
| 1932.....   | 134.6                                 | 52.0           | 82.6            | 11.8                                  | 6.9            | 5.0             | 26.0                                  | 11.0           | 15.1            | 96.7                                  | 34.2           | 62.5            |
| 1933.....   | 134.5                                 | 51.1           | 83.4            | 11.7                                  | 6.6            | 5.1             | 26.8                                  | 11.1           | 15.7            | 96.0                                  | 33.5           | 62.6            |
| 1934.....   | 136.7                                 | 51.4           | 85.3            | 11.6                                  | 6.3            | 5.3             | 28.0                                  | 11.4           | 16.6            | 97.2                                  | 33.8           | 63.4            |
| 1935.....   | 137.0                                 | 50.8           | 86.2            | 11.5                                  | 6.1            | 5.4             | 28.1                                  | 11.2           | 16.9            | 97.4                                  | 33.5           | 63.9            |
| 1936.....   | 144.1                                 | 52.3           | 91.8            | 12.2                                  | 6.3            | 5.8             | 30.4                                  | 11.8           | 18.6            | 101.6                                 | 34.2           | 67.4            |
| 1937.....   | 150.7                                 | 55.0           | 95.7            | 12.8                                  | 6.8            | 6.0             | 32.3                                  | 12.6           | 19.7            | 105.6                                 | 35.6           | 69.9            |
| 1938.....   | 148.0                                 | 54.7           | 93.3            | 12.7                                  | 6.9            | 5.8             | 31.7                                  | 12.5           | 19.2            | 103.5                                 | 35.3           | 68.2            |
| 1939.....   | 148.3                                 | 55.0           | 93.3            | 12.8                                  | 7.0            | 5.8             | 32.0                                  | 12.7           | 19.3            | 103.5                                 | 35.3           | 68.2            |
| 1940.....   | 156.2                                 | 58.1           | 98.1            | 13.4                                  | 7.3            | 6.1             | 34.4                                  | 13.7           | 20.8            | 108.4                                 | 37.1           | 71.3            |
| 1941.....   | 173.3                                 | 64.8           | 108.5           | 15.3                                  | 8.6            | 6.7             | 38.7                                  | 15.0           | 23.7            | 119.4                                 | 41.2           | 78.2            |
| 1942.....   | 187.0                                 | 68.1           | 118.9           | 16.6                                  | 9.4            | 7.3             | 41.6                                  | 15.5           | 26.1            | 128.8                                 | 43.3           | 85.5            |
| 1943.....   | 190.7                                 | 69.1           | 121.6           | 16.9                                  | 9.5            | 7.4             | 42.0                                  | 15.8           | 26.3            | 131.7                                 | 43.8           | 87.9            |
| 1944.....   | 193.6                                 | 71.2           | 122.4           | 17.4                                  | 10.0           | 7.4             | 42.4                                  | 16.4           | 26.0            | 133.9                                 | 44.8           | 89.0            |
| 1945.....   | 208.6                                 | 76.6           | 132.0           | 18.3                                  | 10.2           | 8.1             | 47.4                                  | 18.4           | 29.0            | 142.9                                 | 48.0           | 94.9            |
| 1946.....   | 245.9                                 | 89.6           | 156.3           | 21.2                                  | 11.0           | 10.2            | 60.0                                  | 22.1           | 37.9            | 164.7                                 | 56.5           | 108.2           |
| 1947.....   | 291.6                                 | 111.7          | 182.9           | 25.5                                  | 13.3           | 12.3            | 74.1                                  | 27.6           | 46.5            | 195.0                                 | 70.9           | 124.1           |
| 1948.....   | 325.4                                 | 130.2          | 195.2           | 29.1                                  | 16.1           | 13.1            | 82.3                                  | 32.5           | 49.7            | 214.0                                 | 81.6           | 132.4           |
| 1949.....   | 341.4                                 | 143.7          | 197.7           | 31.8                                  | 18.6           | 13.1            | 85.8                                  | 36.3           | 49.5            | 223.8                                 | 88.7           | 135.1           |
| 1950.....   | 376.5                                 | 163.6          | 212.9           | 35.8                                  | 21.5           | 14.3            | 95.0                                  | 42.0           | 53.0            | 245.7                                 | 100.1          | 145.6           |
| 1951.....   | 416.0                                 | 184.2          | 231.7           | 40.1                                  | 24.4           | 15.7            | 106.3                                 | 48.3           | 58.0            | 269.6                                 | 111.5          | 158.1           |
| 1952.....   | 440.6                                 | 198.4          | 242.2           | 42.5                                  | 26.2           | 16.3            | 112.4                                 | 52.8           | 59.6            | 285.7                                 | 119.4          | 166.3           |
| 1953.....   | 461.9                                 | 213.2          | 248.7           | 44.2                                  | 27.8           | 16.4            | 117.0                                 | 57.3           | 59.6            | 300.7                                 | 128.1          | 172.7           |
| 1954.....   | 482.5                                 | 226.9          | 255.6           | 45.5                                  | 28.9           | 16.6            | 123.6                                 | 62.5           | 60.1            | 314.3                                 | 135.5          | 178.9           |
| 1955.....   | 525.1                                 | 249.2          | 275.9           | 48.2                                  | 30.5           | 17.7            | 134.6                                 | 69.8           | 64.8            | 342.2                                 | 148.9          | 193.4           |
| 1956.....   | 578.9                                 | 278.8          | 302.1           | 51.1                                  | 32.0           | 19.1            | 150.1                                 | 79.8           | 70.4            | 377.7                                 | 165.1          | 212.5           |
| 1957.....   | 617.5                                 | 300.6          | 316.9           | 52.9                                  | 33.4           | 19.5            | 159.9                                 | 87.6           | 72.3            | 404.7                                 | 179.6          | 225.0           |
| 1958.....   | 639.1                                 | 314.3          | 324.7           | 54.2                                  | 34.8           | 19.4            | 163.9                                 | 91.5           | 73.4            | 420.9                                 | 185.0          | 233.9           |
| 1959.....   | 661.3                                 | 326.9          | 334.3           | 55.5                                  | 35.7           | 19.8            | 167.4                                 | 94.9           | 73.5            | 438.3                                 | 196.3          | 242.0           |
| 1960.....   | 630.6                                 | 306.6          | 324.0           | 55.9                                  | 35.7           | 20.2            | 171.0                                 | 97.7           | 73.4            | 453.6                                 | 203.3          | 250.3           |
| 1961.....   | 678.1                                 | 344.1          | 334.1           | 56.8                                  | 36.1           | 20.8            | 174.5                                 | 99.6           | 74.9            | 466.8                                 | 208.4          | 258.4           |
| 1962.....   | 721.1                                 | 383.4          | 337.6           | 58.3                                  | 36.6           | 21.7            | 179.0                                 | 101.7          | 77.3            | 483.7                                 | 215.1          | 268.6           |
| 1963.....   | 747.3                                 | 385.2          | 362.1           | 60.5                                  | 37.8           | 23.7            | 184.8                                 | 104.7          | 80.1            | 502.1                                 | 222.8          | 279.3           |
| 1964.....   | 783.7                                 | 382.7          | 401.0           | 62.7                                  | 38.9           | 23.8            | 192.6                                 | 100.8          | 82.8            | 527.5                                 | 234.0          | 293.5           |
| 1965.....   | 837.7                                 | 408.4          | 429.4           | 66.0                                  | 40.7           | 25.3            | 205.9                                 | 118.2          | 87.5            | 565.8                                 | 249.5          | 316.3           |
| 1966.....   | 910.7                                 | 444.3          | 466.5           | 70.5                                  | 43.3           | 27.3            | 224.8                                 | 129.8          | 94.9            | 615.4                                 | 271.2          | 344.3           |
| 1967.....   | 987.9                                 | 481.0          | 505.9           | 75.7                                  | 46.3           | 29.4            | 244.3                                 | 141.8          | 102.5           | 667.9                                 | 294.0          | 373.9           |
| 1968.....   | 1,087.1                               | 525.5          | 561.6           | 82.0                                  | 49.4           | 31.6            | 266.6                                 | 153.4          | 113.3           | 738.5                                 | 322.7          | 415.8           |
| 1969.....   | 1,213.4                               | 578.7          | 634.7           | 89.7                                  | 53.0           | 36.7            | 295.3                                 | 167.6          | 127.7           | 825.4                                 | 358.1          | 470.3           |
| 1970.....   | 1,339.0                               | 632.4          | 706.6           | 97.6                                  | 57.1           | 40.6            | 331.6                                 | 181.7          | 139.9           | 919.8                                 | 393.6          | 526.2           |
| 1971.....   | 1,452.5                               | 678.7          | 773.7           | 104.4                                 | 60.5           | 41.0            | 311.5                                 | 192.3          | 149.3           | 1,006.5                               | 426.0          | 580.5           |
| 1972.....   | 1,582.7                               | 736.4          | 856.4           | 112.0                                 | 64.0           | 48.0            | 361.0                                 | 203.4          | 160.6           | 1,106.7                               | 459.0          | 647.8           |
| 1973.....   | 1,771.2                               | 812.1          | 959.2           | 126.0                                 | 72.1           | 53.8            | 402.6                                 | 226.1          | 176.5           | 1,242.7                               | 513.9          | 728.8           |
| 1974.....   | 2,021.8                               | 930.1          | 1,091.7         | 146.7                                 | 85.3           | 61.4            | 456.8                                 | 259.4          | 197.4           | 1,418.3                               | 585.4          | 832.9           |
| 1975.....   | 2,276.7                               | 1,068.9        | 1,207.8         | 165.7                                 | 90.5           | 75.2            | 511.2                                 | 294.0          | 217.2           | 1,599.8                               | 684.3          | 915.5           |

Source: U.S. Survey of Current Business, April 1976, p.46

Note: Data on Business Capital by Legal Form of Organization (Corporate, Non-Corporate) are also given in the Survey of Current Business, April 1976.

Appendix Table II.10.

U.S. Gross Fixed Nonresidential Business Capital  
Stock by Major Industry Group, 1925-75  
(Billions of 1972 Dollars)

| End of<br>Year | Total                                    |                |                 | By major industry group                  |                |                 |                                          |                |                 |                                          |                |                 |
|----------------|------------------------------------------|----------------|-----------------|------------------------------------------|----------------|-----------------|------------------------------------------|----------------|-----------------|------------------------------------------|----------------|-----------------|
|                |                                          |                |                 | Farm                                     |                |                 | Manufacturing                            |                |                 | Nonfarm nonmanu-<br>facturing            |                |                 |
|                | Equip-<br>ment<br>and<br>struc-<br>tures | Equip-<br>ment | Struc-<br>tures | Equip-<br>ment<br>and<br>struc-<br>tures | Equip-<br>ment | Struc-<br>tures | Equip-<br>ment<br>and<br>struc-<br>tures | Equip-<br>ment | Struc-<br>tures | Equip-<br>ment<br>and<br>struc-<br>tures | Equip-<br>ment | Struc-<br>tures |
| 1925.....      | 564.7                                    | 169.3          | 395.4           | 52.4                                     | 16.3           | 36.1            | 128.9                                    | 41.1           | 87.8            | 383.4                                    | 111.9          | 271.6           |
| 1926.....      | 580.5                                    | 174.8          | 405.7           | 53.0                                     | 16.9           | 36.0            | 133.0                                    | 42.5           | 90.5            | 394.5                                    | 115.3          | 279.2           |
| 1927.....      | 594.5                                    | 178.3          | 416.1           | 53.2                                     | 17.3           | 35.9            | 136.6                                    | 43.5           | 93.1            | 404.7                                    | 117.5          | 287.2           |
| 1928.....      | 608.0                                    | 182.2          | 425.8           | 53.6                                     | 18.0           | 35.6            | 141.0                                    | 44.7           | 96.3            | 413.4                                    | 119.5          | 293.9           |
| 1929.....      | 623.8                                    | 187.1          | 436.7           | 54.0                                     | 18.7           | 35.3            | 146.6                                    | 46.0           | 100.6           | 423.2                                    | 122.4          | 300.8           |
| 1930.....      | 633.2                                    | 188.8          | 444.4           | 53.8                                     | 19.2           | 34.7            | 148.5                                    | 46.3           | 102.2           | 430.9                                    | 123.3          | 307.5           |
| 1931.....      | 631.9                                    | 186.5          | 445.4           | 53.0                                     | 19.1           | 33.9            | 147.3                                    | 45.8           | 101.5           | 431.6                                    | 121.7          | 309.9           |
| 1932.....      | 621.7                                    | 180.6          | 441.0           | 51.3                                     | 18.4           | 33.0            | 143.9                                    | 44.2           | 99.6            | 426.5                                    | 118.0          | 308.4           |
| 1933.....      | 609.5                                    | 174.3          | 435.2           | 49.5                                     | 17.4           | 32.1            | 141.5                                    | 42.7           | 98.8            | 418.5                                    | 114.3          | 304.2           |
| 1934.....      | 599.1                                    | 169.3          | 429.8           | 48.2                                     | 16.9           | 31.3            | 139.3                                    | 41.4           | 97.9            | 411.6                                    | 111.0          | 300.6           |
| 1935.....      | 590.5                                    | 166.1          | 424.4           | 47.4                                     | 16.8           | 30.6            | 137.3                                    | 40.8           | 96.6            | 405.8                                    | 108.6          | 297.3           |
| 1936.....      | 587.0                                    | 166.1          | 421.0           | 47.2                                     | 17.2           | 30.0            | 136.9                                    | 41.0           | 96.0            | 402.8                                    | 107.9          | 294.9           |
| 1937.....      | 587.7                                    | 167.7          | 420.0           | 47.5                                     | 18.0           | 29.5            | 138.1                                    | 41.6           | 96.5            | 402.2                                    | 108.1          | 294.0           |
| 1938.....      | 581.6                                    | 165.1          | 416.5           | 47.0                                     | 18.2           | 28.9            | 136.3                                    | 41.0           | 95.3            | 398.2                                    | 106.0          | 292.3           |
| 1939.....      | 577.0                                    | 163.7          | 413.3           | 46.8                                     | 18.4           | 28.3            | 135.2                                    | 40.8           | 94.4            | 395.1                                    | 104.5          | 290.6           |
| 1940.....      | 576.5                                    | 161.9          | 414.5           | 46.3                                     | 18.6           | 27.6            | 136.0                                    | 41.6           | 94.4            | 394.2                                    | 104.7          | 289.5           |
| 1941.....      | 580.3                                    | 169.1          | 411.2           | 47.0                                     | 20.0           | 27.0            | 138.9                                    | 43.0           | 95.9            | 394.3                                    | 106.1          | 288.2           |
| 1942.....      | 573.7                                    | 168.1          | 405.6           | 46.8                                     | 20.4           | 26.4            | 137.7                                    | 43.3           | 94.4            | 389.2                                    | 104.3          | 284.8           |
| 1943.....      | 562.9                                    | 165.6          | 397.3           | 45.8                                     | 19.9           | 25.9            | 135.4                                    | 43.6           | 91.7            | 381.7                                    | 102.0          | 279.7           |
| 1944.....      | 557.2                                    | 166.9          | 390.3           | 46.0                                     | 20.6           | 25.4            | 134.3                                    | 44.9           | 89.4            | 377.0                                    | 101.4          | 275.5           |
| 1945.....      | 561.2                                    | 174.9          | 386.3           | 46.2                                     | 21.3           | 24.9            | 137.7                                    | 48.4           | 89.3            | 377.4                                    | 105.2          | 272.2           |
| 1946.....      | 583.9                                    | 189.9          | 393.9           | 47.6                                     | 21.8           | 25.8            | 150.7                                    | 54.5           | 96.2            | 385.5                                    | 113.6          | 271.9           |
| 1947.....      | 618.1                                    | 217.8          | 400.3           | 50.7                                     | 24.1           | 28.6            | 164.6                                    | 63.8           | 109.7           | 402.9                                    | 129.9          | 273.0           |
| 1948.....      | 647.4                                    | 240.3          | 407.1           | 54.7                                     | 27.5           | 27.2            | 174.6                                    | 70.9           | 103.7           | 418.0                                    | 141.9          | 276.1           |
| 1949.....      | 658.6                                    | 255.8          | 412.8           | 58.9                                     | 31.1           | 27.9            | 180.5                                    | 75.5           | 105.0           | 429.2                                    | 149.2          | 279.9           |
| 1950.....      | 693.6                                    | 274.0          | 419.6           | 63.2                                     | 34.7           | 28.5            | 185.9                                    | 80.3           | 105.7           | 444.5                                    | 159.1          | 285.4           |
| 1951.....      | 721.4                                    | 294.2          | 427.2           | 66.8                                     | 37.8           | 29.1            | 194.2                                    | 86.9           | 107.3           | 460.4                                    | 169.5          | 290.8           |
| 1952.....      | 747.0                                    | 312.5          | 434.5           | 69.7                                     | 40.0           | 29.7            | 202.0                                    | 93.3           | 108.6           | 475.3                                    | 179.2          | 296.2           |
| 1953.....      | 775.2                                    | 331.8          | 443.4           | 72.5                                     | 42.3           | 30.2            | 209.4                                    | 99.5           | 109.9           | 493.3                                    | 190.0          | 303.3           |
| 1954.....      | 800.6                                    | 347.0          | 453.6           | 74.5                                     | 43.7           | 30.8            | 216.9                                    | 105.6          | 111.3           | 509.2                                    | 197.7          | 311.5           |
| 1955.....      | 830.2                                    | 363.4          | 466.8           | 76.1                                     | 44.9           | 31.2            | 224.7                                    | 110.5          | 114.2           | 529.3                                    | 207.9          | 321.4           |
| 1956.....      | 861.1                                    | 379.5          | 481.6           | 78.8                                     | 45.1           | 31.7            | 233.9                                    | 117.2          | 116.7           | 559.4                                    | 217.2          | 332.2           |
| 1957.....      | 891.5                                    | 395.2          | 496.3           | 77.2                                     | 45.1           | 32.2            | 242.6                                    | 123.3          | 119.3           | 571.6                                    | 226.8          | 344.8           |
| 1958.....      | 912.8                                    | 403.7          | 509.1           | 78.1                                     | 45.5           | 32.6            | 247.3                                    | 125.8          | 121.5           | 587.4                                    | 232.4          | 355.0           |
| 1959.....      | 937.1                                    | 414.6          | 522.5           | 79.3                                     | 45.8           | 33.4            | 250.5                                    | 128.0          | 122.5           | 607.4                                    | 240.8          | 366.6           |
| 1960.....      | 968.9                                    | 426.0          | 542.9           | 79.6                                     | 45.5           | 34.1            | 254.4                                    | 130.5          | 123.9           | 629.9                                    | 250.0          | 379.9           |
| 1961.....      | 988.9                                    | 431.9          | 556.9           | 80.4                                     | 45.5           | 34.9            | 257.8                                    | 132.1          | 125.6           | 650.7                                    | 257.3          | 393.4           |
| 1962.....      | 1,018.2                                  | 446.1          | 572.1           | 81.5                                     | 45.7           | 35.8            | 261.6                                    | 134.1          | 127.5           | 675.1                                    | 266.3          | 408.8           |
| 1963.....      | 1,048.8                                  | 459.1          | 589.7           | 83.3                                     | 46.7           | 36.7            | 266.1                                    | 136.8          | 129.3           | 694.4                                    | 275.7          | 423.7           |
| 1964.....      | 1,085.5                                  | 476.6          | 608.9           | 85.1                                     | 47.5           | 37.6            | 271.9                                    | 141.1          | 139.9           | 728.5                                    | 283.0          | 445.5           |
| 1965.....      | 1,135.2                                  | 500.6          | 634.6           | 87.4                                     | 48.9           | 38.5            | 281.6                                    | 147.9          | 143.7           | 766.2                                    | 303.9          | 462.3           |
| 1966.....      | 1,193.1                                  | 530.7          | 662.4           | 90.4                                     | 50.8           | 39.6            | 294.8                                    | 157.0          | 157.9           | 807.9                                    | 322.9          | 484.9           |
| 1967.....      | 1,246.8                                  | 558.1          | 688.7           | 93.7                                     | 52.8           | 40.9            | 308.5                                    | 166.0          | 162.5           | 844.7                                    | 339.3          | 505.4           |
| 1968.....      | 1,304.0                                  | 588.4          | 715.6           | 96.3                                     | 54.4           | 41.9            | 319.7                                    | 173.8          | 165.9           | 888.0                                    | 360.2          | 527.8           |
| 1969.....      | 1,366.0                                  | 622.4          | 743.6           | 98.9                                     | 56.0           | 42.9            | 331.4                                    | 182.0          | 169.4           | 935.6                                    | 384.3          | 551.3           |
| 1970.....      | 1,421.6                                  | 651.4          | 770.1           | 101.7                                    | 57.7           | 44.0            | 346.8                                    | 188.9          | 151.9           | 979.0                                    | 404.8          | 574.2           |
| 1971.....      | 1,471.7                                  | 677.2          | 794.5           | 103.7                                    | 58.7           | 45.1            | 346.8                                    | 193.9          | 152.9           | 1,021.2                                  | 424.7          | 596.5           |
| 1972.....      | 1,527.6                                  | 707.5          | 820.1           | 106.2                                    | 60.3           | 45.9            | 353.5                                    | 200.1          | 153.4           | 1,068.0                                  | 447.1          | 620.8           |
| 1973.....      | 1,594.3                                  | 747.1          | 847.2           | 110.5                                    | 63.4           | 47.2            | 363.8                                    | 209.1          | 154.7           | 1,120.0                                  | 474.7          | 645.3           |
| 1974.....      | 1,658.1                                  | 783.8          | 874.2           | 115.5                                    | 66.7           | 48.8            | 375.5                                    | 218.6          | 156.9           | 1,167.1                                  | 498.6          | 668.5           |
| 1975.....      | 1,706.9                                  | 812.2          | 894.7           | 119.2                                    | 68.8           | 50.4            | 383.8                                    | 223.4          | 160.4           | 1,203.9                                  | 520.0          | 683.9           |

Source: U.S. Survey of Current Business, April 1976, p.48

Note: Data on Business Capital by Legal Form of Organization (Corporate, Non-Corporate) are also given in the Survey of Current Business, April 1976.

Appendix Table II.11.

United Kingdom. Gross Capital Stock at 1970 Replacement Cost,  
by Industries, 1964-1974<sup>1</sup>

Data in £ thousand million.

|                                                                    | 1964  | 1965  | 1966  | 1967  | 1968  | 1969  | 1970  | 1971  | 1972  | 1973  | 1974  |
|--------------------------------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Agriculture .....                                                  | 2.6   | 2.7   | 2.8   | 2.9   | 3.1   | 3.2   | 3.3   | 3.4   | 3.5   | 3.7   | 3.9   |
| Forestry and Fishing .....                                         | 0.3   | 0.3   | 0.3   | 0.3   | 0.3   | 0.3   | 0.3   | 0.3   | 0.3   | 0.3   | 0.3   |
| Mining and quarrying .....                                         | 2.1   | 2.1   | 2.2   | 2.2   | 2.3   | 2.3   | 2.3   | 2.4   | 2.4   | 2.5   | 2.8   |
| Manufacturing:                                                     |       |       |       |       |       |       |       |       |       |       |       |
| Food, drink and tobacco .....                                      | 3.4   | 3.6   | 3.8   | 4.0   | 4.2   | 4.3   | 4.5   | 4.7   | 4.9   | 5.2   | 5.4   |
| Coal, petroleum products,<br>chemicals and allied industries ..... | 5.3   | 5.6   | 5.9   | 6.2   | 6.6   | 6.9   | 7.3   | 7.7   | 8.0   | 8.1   | 8.4   |
| Iron and steel .....                                               | 3.7   | 3.8   | 3.8   | 3.9   | 3.9   | 4.0   | 4.1   | 4.3   | 4.4   | 4.5   | 4.7   |
| Other metals, engineering and<br>allied industries .....           | 11.7  | 12.1  | 12.6  | 13.0  | 13.3  | 13.7  | 14.2  | 14.5  | 14.7  | 15.1  | 15.5  |
| Bricks, pottery, glass, cement, etc .....                          | 1.2   | 1.3   | 1.4   | 1.4   | 1.5   | 1.6   | 1.7   | 1.7   | 1.8   | 1.9   | 1.9   |
| Timber, furniture, etc. ....                                       | 0.5   | 0.5   | 0.5   | 0.5   | 0.6   | 0.6   | 0.6   | 0.6   | 0.7   | 0.7   | 0.7   |
| Paper, printing and publishing .....                               | 2.2   | 2.3   | 2.3   | 2.4   | 2.5   | 2.6   | 2.7   | 2.8   | 2.9   | 2.9   | 3.1   |
| Textiles, leather, clothing and<br>other manufacturing .....       | 4.4   | 4.5   | 4.7   | 4.9   | 5.0   | 5.3   | 5.4   | 5.6   | 5.7   | 5.9   | 6.1   |
| Total .....                                                        | 32.4  | 33.7  | 35.0  | 36.3  | 37.6  | 39.0  | 40.5  | 41.9  | 43.1  | 44.3  | 45.8  |
| Construction .....                                                 | 1.4   | 1.6   | 1.7   | 1.9   | 2.0   | 2.1   | 2.3   | 2.4   | 2.5   | 2.5   | 2.6   |
| Gas .....                                                          | 1.7   | 1.7   | 1.9   | 2.2   | 2.4   | 2.6   | 2.7   | 2.8   | 2.9   | 2.9   | 3.0   |
| Electricity .....                                                  | 8.3   | 9.0   | 9.8   | 10.5  | 11.0  | 11.4  | 11.7  | 12.0  | 12.2  | 12.4  | 12.5  |
| Water .....                                                        | 2.9   | 2.9   | 3.0   | 3.0   | 3.0   | 3.1   | 3.1   | 3.2   | 3.3   | 3.3   | 3.4   |
| Railways .....                                                     | 8.0   | 8.0   | 8.0   | 8.0   | 7.9   | 7.8   | 7.8   | 7.7   | 7.7   | 7.6   | 7.6   |
| Road passenger transport .....                                     | 0.6   | 0.6   | 0.6   | 0.6   | 0.7   | 0.7   | 0.7   | 0.7   | 0.8   | 0.8   | 0.8   |
| Road haulage and storage .....                                     | 0.8   | 0.9   | 0.9   | 1.0   | 1.1   | 1.2   | 1.2   | 1.3   | 1.4   | 1.4   | 1.5   |
| Shipping .....                                                     | 3.1   | 3.1   | 3.1   | 3.1   | 3.1   | 3.3   | 3.5   | 3.6   | 3.9   | 4.2   | 4.4   |
| Harbours, docks and canals .....                                   | 1.5   | 1.5   | 1.5   | 1.5   | 1.6   | 1.6   | 1.6   | 1.6   | 1.6   | 1.7   | 1.6   |
| Air transport .....                                                | 0.7   | 0.8   | 0.8   | 0.8   | 0.9   | 0.9   | 1.0   | 1.1   | 1.1   | 1.2   | 1.2   |
| Postal, telephone and radio<br>communications .....                | 3.5   | 3.6   | 3.8   | 4.1   | 4.4   | 4.7   | 5.1   | 5.5   | 5.8   | 6.3   | 6.7   |
| Distributive trades and other service<br>industries .....          | 12.9  | 13.8  | 14.7  | 15.5  | 16.5  | 17.6  | 18.8  | 20.0  | 21.4  | 22.9  | 24.3  |
| Private dwellings .....                                            | 28.5  | 29.2  | 29.9  | 30.6  | 31.4  | 32.2  | 32.8  | 33.7  | 34.6  | 35.5  | 36.2  |
| Public dwellings .....                                             | 13.7  | 14.4  | 15.1  | 16.0  | 16.9  | 17.8  | 18.6  | 19.3  | 20.0  | 20.8  | 21.6  |
| Roads[2] .....                                                     | 3.2   | 3.4   | 3.6   | 3.9   | 4.2   | 4.5   | 5.0   | 5.4   | 5.7   | 6.1   | 6.4   |
| Other public services .....                                        | 12.7  | 13.3  | 13.9  | 14.7  | 15.5  | 16.3  | 17.2  | 18.1  | 19.2  | 20.2  | 21.1  |
| Total gross capital stock .....                                    | 140.9 | 146.6 | 152.6 | 159.1 | 165.9 | 172.6 | 179.5 | 186.4 | 193.4 | 200.6 | 207.7 |

[1] For an account of the principles of valuation, see *National Accounts Statistics: Sources and Methods*, pages 383-7. Figures relate to end of year.

[2] Excluding the non-renewable element more than 75 years old.

Source: Central Statistical Office. Annual Abstract of Statistics, 1975  
p. 328.

Appendix Table II.12. Distribution of U.S., F.R.G. and U.K. Gross Capital Stock  
by Industries, 1970

| I n d u s t r i e s                                                                                                                                                                                                                                                         | U.S.A.<br>Business Capital Stock<br>in 1958 Prices |      | F.R.G.<br>Capital Stock, All Sectors<br>of the Economy, 1962 Prices |      | United Kingdom<br>Capital Stock at<br>1970 Replacement Cost        |                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|------|---------------------------------------------------------------------|------|--------------------------------------------------------------------|-------------------|
|                                                                                                                                                                                                                                                                             | Billion \$                                         | %    | Billion D-Mark                                                      | %    | Billion £                                                          | %                 |
| Agriculture                                                                                                                                                                                                                                                                 | 70.5                                               | 7.5  | 105.1                                                               | 11.4 | 4.2                                                                | 3.4               |
| Energy:                                                                                                                                                                                                                                                                     |                                                    |      |                                                                     |      |                                                                    |                   |
| Coal Mining                                                                                                                                                                                                                                                                 | 4.2                                                |      | .                                                                   |      | 1                                                                  |                   |
| Crude Petr. & Nat. Gas                                                                                                                                                                                                                                                      | 58.5                                               |      | .                                                                   |      | 8.4 <sup>b</sup>                                                   |                   |
| Petr. Refining                                                                                                                                                                                                                                                              | 15.0                                               |      | .                                                                   |      | 12.5                                                               |                   |
| Electric Utilities                                                                                                                                                                                                                                                          | 82.7 <sup>a</sup>                                  |      | .                                                                   |      | 3.0                                                                |                   |
| Gas Utilities                                                                                                                                                                                                                                                               | 25.3                                               |      | .                                                                   |      |                                                                    |                   |
| Total Energy Sector                                                                                                                                                                                                                                                         | 185.7 <sup>a</sup>                                 | 19.7 | 151.6                                                               | 16.4 | 23.9 <sup>b</sup>                                                  | 19.5 <sup>b</sup> |
| Mining, excl. Fuels                                                                                                                                                                                                                                                         | 6.4                                                | 0.7  | 4.4                                                                 | 0.5  | 2.8                                                                | 2.3               |
| Stone Quarrying                                                                                                                                                                                                                                                             | 11.1                                               | 1.1  | 16.3                                                                | 1.8  | .                                                                  | .                 |
| Manufacturing:                                                                                                                                                                                                                                                              |                                                    |      |                                                                     |      |                                                                    |                   |
| Food and Tobacco                                                                                                                                                                                                                                                            | 22.8                                               |      | 32.1                                                                |      |                                                                    |                   |
| Textiles                                                                                                                                                                                                                                                                    | 7.3                                                |      | 18.5                                                                |      |                                                                    |                   |
| Clothing                                                                                                                                                                                                                                                                    | 5.0                                                |      | 6.3                                                                 |      |                                                                    |                   |
| Wood, Paper, Printings                                                                                                                                                                                                                                                      | 31.7                                               |      | 24.7                                                                |      |                                                                    |                   |
| Chemicals                                                                                                                                                                                                                                                                   | 35.5                                               |      | 49.5                                                                |      |                                                                    |                   |
| Metals-Basic Industries                                                                                                                                                                                                                                                     | 36.3                                               |      | 53.0                                                                |      |                                                                    |                   |
| Metals-Processing                                                                                                                                                                                                                                                           | 13.2                                               |      | 26.8                                                                |      |                                                                    |                   |
| Vehicles                                                                                                                                                                                                                                                                    | 17.1                                               |      | 14.3                                                                |      |                                                                    |                   |
| Machinery                                                                                                                                                                                                                                                                   | 34.8                                               |      | 53.4                                                                |      |                                                                    |                   |
| Armaments                                                                                                                                                                                                                                                                   | 1.6                                                |      | -                                                                   |      |                                                                    |                   |
| Total Manufacturing                                                                                                                                                                                                                                                         | 205.3                                              | 21.8 | 278.6                                                               | 30.1 | 37.4 <sup>c</sup>                                                  | 30.5 <sup>c</sup> |
| Construction                                                                                                                                                                                                                                                                | 17.1                                               | 1.8  | 43.1                                                                | 4.7  | 2.6                                                                | 2.1               |
| Transportation                                                                                                                                                                                                                                                              | 129.3                                              | 13.7 | 118.1                                                               | 12.8 | 17.1                                                               | 14.0              |
| Trade                                                                                                                                                                                                                                                                       | 85.2                                               | 9.0  | 96.8                                                                | 10.5 | 24.3 <sup>d</sup>                                                  | 19.9 <sup>d</sup> |
| Other Services                                                                                                                                                                                                                                                              | 232.7                                              | 24.7 | 108.4                                                               | 11.8 | 10.1                                                               | 8.3               |
| Total, excl. Residential<br>and Government                                                                                                                                                                                                                                  | 943.3 = 100                                        |      | 922.4 = 100.0                                                       |      | 122.4 = 100.0                                                      |                   |
| Residential:                                                                                                                                                                                                                                                                |                                                    |      |                                                                     |      |                                                                    |                   |
| Business                                                                                                                                                                                                                                                                    | 40.8                                               |      | .                                                                   |      | .                                                                  | .                 |
| Non-Business                                                                                                                                                                                                                                                                | -                                                  |      | .                                                                   |      | .                                                                  | .                 |
| Total Residential                                                                                                                                                                                                                                                           |                                                    |      | 443.8                                                               |      | 57.8                                                               | .                 |
| Government                                                                                                                                                                                                                                                                  | -                                                  |      | 241.9                                                               |      | 21.1 <sup>b</sup>                                                  |                   |
| Grand Total                                                                                                                                                                                                                                                                 | -                                                  |      | 1608.1                                                              |      | 207.7                                                              | .                 |
| Sources: U.S. data summarized from capital stock data for 80 industries, in Department of Commerce, BEA study of Fixed Capital Requirements, op.cit., p.53-54<br>F.R.G. data supplied by Pestel team. (The total differs from totals given in 1975 Statistisches Jahrbuch). |                                                    |      |                                                                     |      | U.K. data compiled from U.K. Annual Abstract of Statistics, p.328. |                   |

a = excludes Federal Power Plants  
b = Coal, Petroleum and Chemicals  
c = excludes Chemicals  
d = includes other services  
e = Roads and other public services



Appendix Table II.13. World Capital Stock Percentage Distribution by Regions,  
1950 - 1970

| Year | World Total<br>1963<br>Prices | R e g i o n s      |                 |       |                 |     |               |            |        |                         |                     |
|------|-------------------------------|--------------------|-----------------|-------|-----------------|-----|---------------|------------|--------|-------------------------|---------------------|
|      |                               | D e v e l o p e d  |                 |       | Other Developed |     |               | Developing |        | USSR<br>East.<br>Europe | China<br>(Mainland) |
|      |                               | North**<br>America | West.<br>Europe | Japan | Other Developed |     | Latin America |            | Others |                         |                     |
|      | Billion*\$                    | %                  | %               | %     | %               | %   | %             | %          | %      | %                       | %                   |
| 1950 | (2654.8)                      | 100.0              | 58.7            | 18.6  | 1.0             | 2.4 | 3.9           | 3.8        | 6.4    | 5.2                     |                     |
| 1951 | (2788.3)                      | 100.0              | 58.0            | 19.0  | 1.1             | 2.4 | 3.9           | 3.9        | 6.6    | 5.1                     |                     |
| 1952 | (2926.1)                      | 100.0              | 57.3            | 19.3  | 1.2             | 2.4 | 3.9           | 4.0        | 6.8    | 5.1                     |                     |
| 1953 | (3064.7)                      | 100.0              | 56.5            | 19.7  | 1.3             | 2.4 | 3.9           | 4.1        | 7.0    | 5.1                     |                     |
| 1954 | (3211.2)                      | 100.0              | 55.7            | 20.0  | 1.4             | 2.5 | 4.0           | 4.0        | 7.3    | 5.1                     |                     |
| 1955 | (3370.0)                      | 100.0              | 54.8            | 20.4  | 1.5             | 2.5 | 4.0           | 4.2        | 7.5    | 5.1                     |                     |
| 1956 | (3549.6)                      | 100.0              | 54.0            | 20.9  | 1.6             | 2.5 | 4.0           | 4.1        | 7.8    | 5.1                     |                     |
| 1957 | (3743.8)                      | 100.0              | 53.0            | 21.3  | 1.7             | 2.5 | 4.0           | 4.3        | 8.1    | 5.1                     |                     |
| 1958 | (3943.0)                      | 100.0              | 52.1            | 21.7  | 1.8             | 2.5 | 4.0           | 4.4        | 8.4    | 5.1                     |                     |
| 1959 | (4145.2)                      | 100.0              | 51.0            | 22.0  | 1.9             | 2.5 | 4.0           | 4.6        | 8.9    | 5.1                     |                     |
| 1960 | (4367.6)                      | 100.0              | 50.0            | 22.3  | 2.1             | 2.5 | 4.0           | 4.6        | 9.4    | 5.1                     |                     |
| 1961 | (4604.5)                      | 100.0              | 48.9            | 22.7  | 2.3             | 2.5 | 4.0           | 4.7        | 9.8    | 5.1                     |                     |
| 1962 | (4853.1)                      | 100.0              | 47.7            | 23.2  | 2.5             | 2.5 | 4.0           | 4.8        | 10.3   | 5.0                     |                     |
| 1963 | (5117.9)                      | 100.0              | 46.7            | 23.6  | 2.8             | 2.5 | 4.0           | 4.8        | 10.7   | 4.9                     |                     |
| 1964 | (5394.5)                      | 100.0              | 45.7            | 24.0  | 3.0             | 2.5 | 4.0           | 5.0        | 11.0   | 4.8                     |                     |
| 1965 | (5699.5)                      | 100.0              | 44.7            | 24.5  | 3.3             | 2.5 | 4.0           | 4.8        | 11.4   | 4.8                     |                     |
| 1966 | (6022.6)                      | 100.0              | 43.9            | 24.8  | 3.5             | 2.5 | 4.0           | 4.9        | 11.6   | 4.8                     |                     |
| 1967 | (6368.4)                      | 100.0              | 43.0            | 25.1  | 3.7             | 2.5 | 4.0           | 5.1        | 11.8   | 4.8                     |                     |
| 1968 | (6720.1)                      | 100.0              | 42.2            | 25.4  | 4.1             | 2.5 | 4.0           | 5.0        | 12.1   | 4.7                     |                     |
| 1969 | (7101.5)                      | 100.0              | 41.4            | 25.6  | 4.4             | 2.5 | 4.0           | 5.2        | 12.3   | 4.6                     |                     |
| 1970 | (7511.5)                      | 100.0              | 40.6            | 25.8  | 4.8             | 2.5 | 4.0           | 5.2        | 12.5   | 4.6                     |                     |

Source: Compiled from W. Ströbele, Untersuchungen zum Wachstum der Weltwirtschaft, 1975 op.cit. p.170-172.

\* When checked against other sources, it was found that the dollar values estimated by Ströbele were too high; however, his percentage distribution within the regions checks with other sources.

\*\* North America defined as United States and Canada.

Appendix Table II.14. World Gross Capital Stock by Regions,  
1950 and 1970  
(Percentage Distribution)

| Region:              | W.Ströbele        |                   | UN Future<br>of the World<br>Economy<br>1970 |
|----------------------|-------------------|-------------------|----------------------------------------------|
|                      | 1950<br>%         | 1970<br>%         | 1970<br>%                                    |
| Developed            |                   |                   |                                              |
| North America        | 58.7              | 40.6              | 39.5                                         |
| Western Europe       | 18.6              | 25.8              | 25.6                                         |
| Japan                | 1.0               | 4.8               | 5.5                                          |
| Other                | 2.4               | 2.5               | 1.9                                          |
| Developing           |                   |                   |                                              |
| Latin America        | 3.9               | 4.0               | 3.5                                          |
| Other                | 3.8               | 5.2               | 3.3                                          |
| USSR, Eastern Europe | 6.4               | 12.5              | 18.1                                         |
| China, Peoples Rep.  | 5.2               | 4.6               | 2.6                                          |
| Total In Percent     | 100.0             | 100.0             | 100.0                                        |
| In Billion \$        | 2655 <sup>a</sup> | 7512 <sup>a</sup> | 5693 <sup>b</sup>                            |

a = 1963 Prices; b = 1970 Prices.

C.III. CAPITAL OUTPUT RATIOS

Appendix Table III.1. World Average Capital/Output Ratios,  
by Regions, 1950-1970

| Year | Total<br>World | R e g i o n s    |                 |       |                                         |                  |                                     |                         |                          |
|------|----------------|------------------|-----------------|-------|-----------------------------------------|------------------|-------------------------------------|-------------------------|--------------------------|
|      |                | North<br>America | West.<br>Europe | Japan | Total<br>Western<br>Industri-<br>alized | Latin<br>America | Total<br>Develo-<br>ping<br>Countr. | USSR<br>East.<br>Europe | China<br>(Main-<br>land) |
| 1950 | 2.23           | 3.88             | 2.09            | 1.06  | 3.14                                    | 2.45             | 1.75                                | 1.65                    | 3.78                     |
| 1951 | 2.18           | 3.58             | 2.16            | 1.19  | 3.07                                    | 2.45             | 1.77                                | 1.60                    | 3.38                     |
| 1952 | 2.14           | 3.71             | 2.19            | 1.31  | 3.09                                    | 2.49             | 1.80                                | 1.61                    | 2.99                     |
| 1953 | 2.15           | 3.67             | 2.22            | 1.42  | 3.08                                    | 2.54             | 1.81                                | 1.63                    | 3.10                     |
| 1954 | 2.15           | 3.85             | 2.26            | 1.49  | 3.18                                    | 2.47             | 1.82                                | 1.58                    | 3.09                     |
| 1955 | 2.18           | 3.67             | 2.28            | 1.54  | 3.09                                    | 2.45             | 1.84                                | 1.54                    | 3.10                     |
| 1956 | 2.16           | 3.76             | 2.32            | 1.59  | 3.14                                    | 2.48             | 1.86                                | 1.57                    | 2.92                     |
| 1957 | 2.22           | 3.80             | 2.39            | 1.67  | 3.19                                    | 2.47             | 1.92                                | 1.57                    | 2.98                     |
| 1958 | 2.20           | 3.98             | 2.53            | 1.79  | 3.34                                    | 2.44             | 1.94                                | 1.58                    | 2.83                     |
| 1959 | 1.19           | 3.86             | 2.57            | 1.85  | 3.29                                    | 2.51             | 1.99                                | 1.60                    | 3.06                     |
| 1960 | 2.33           | 3.89             | 2.56            | 1.84  | 3.28                                    | 2.49             | 1.99                                | 1.65                    | 3.29                     |
| 1961 | 2.47           | 3.93             | 2.60            | 1.81  | 3.30                                    | 2.46             | 2.01                                | 1.71                    | 4.02                     |
| 1962 | 2.51           | 3.79             | 2.68            | 2.00  | 3.27                                    | 2.49             | 2.05                                | 1.80                    | 4.13                     |
| 1963 | 2.51           | 3.75             | 2.77            | 2.07  | 3.28                                    | 2.55             | 2.09                                | 1.90                    | 3.94                     |
| 1964 | 2.46           | 3.69             | 2.80            | 2.08  | 3.25                                    | 2.48             | 2.07                                | 1.89                    | 3.75                     |
| 1965 | 2.46           | 3.57             | 2.87            | 2.30  | 3.23                                    | 2.48             | 2.12                                | 1.95                    | 3.50                     |
| 1966 | 2.48           | 3.45             | 2.97            | 2.37  | 3.21                                    | 2.49             | 2.16                                | 1.94                    | 3.46                     |
| 1967 | 2.56           | 3.50             | 3.07            | 2.35  | 3.27                                    | 2.52             | 2.17                                | 1.94                    | 3.85                     |
| 1968 | 2.58           | 3.45             | 3.11            | 2.35  | 3.25                                    | 2.49             | 2.18                                | 1.96                    | 3.94                     |
| 1969 | 2.56           | 3.47             | 3.12            | 2.41  | 3.25                                    | 2.47             | 2.17                                | 2.01                    | 3.92                     |
| 1970 | 2.54           | 3.62             | 3.19            | 2.52  | 3.36                                    | 2.47             | 2.19                                | 1.99                    | 3.79                     |

Source: Compiled from W. Ströbele. Untersuchungen zum Wachstum der Weltwirtschaft, op.cit. p.174/175, tables 1.23 and 1.24

Note: As stated in the note to Appendix Table II.13 the gross capital stock levels, estimated by Ströbele, are too high. Consequently, the capital output ratios are also too high. However, the table may serve to indicate regional differences and trends.

Appendix Table III.2.

U.S. Capital/Output Ratios, Selected Concepts\*  
1947-1974

| Year | Total Economy <sup>1)</sup> |          |                      | Business <sup>2)</sup>                                  |              |
|------|-----------------------------|----------|----------------------|---------------------------------------------------------|--------------|
|      | Total Capital Stock         | GDP      | Capital/Output Ratio | Capital Output Ratios Adjusted for Capacity Utilization | Not Adjusted |
|      | current prices              |          |                      | 1958 prices                                             |              |
|      | Bill.\$                     | Bill. \$ |                      |                                                         |              |
| 1947 | NA                          | 231.3    | NA                   | 1.553                                                   | 1.631        |
| 1948 | NA                          | 157.6    | NA                   | 1.516                                                   | 1.633        |
| 1949 | NA                          | 256.5    | NA                   | 1.387                                                   | 1.696        |
| 1950 | NA                          | 284.8    | NA                   | 1.436                                                   | 1.599        |
| 1951 | NA                          | 328.4    | NA                   | 1.425                                                   | 1.563        |
| 1952 | 916.0                       | 345.5    | 2.651                | 1.404                                                   | 1.573        |
| 1953 | 958.8                       | 364.6    | 2.630                | 1.433                                                   | 1.547        |
| 1954 | 1001.2                      | 364.8    | 2.745                | 1.348                                                   | 1.618        |
| 1955 | 1090.1                      | 398.0    | 2.739                | 1.405                                                   | 1.542        |
| 1956 | 1188.8                      | 419.2    | 2.836                | 1.421                                                   | 1.572        |
| 1957 | 1263.0                      | 441.1    | 2.863                | 1.399                                                   | 1.601        |
| 1958 | 1319.1                      | 447.3    | 2.949                | 1.283                                                   | 1.659        |
| 1959 | 1384.3                      | 483.7    | 2.862                | 1.318                                                   | 1.584        |
| 1960 | 1439.6                      | 503.7    | 2.858                | 1.299                                                   | 1.588        |
| 1961 | 1495.3                      | 520.1    | 2.875                | 1.263                                                   | 1.598        |
| 1962 | 1573.6                      | 560.3    | 2.808                | 1.264                                                   | 1.537        |
| 1963 | 1658.9                      | 590.5    | 2.809                | 1.268                                                   | 1.514        |
| 1964 | 1755.1                      | 632.4    | 2.775                | 1.279                                                   | 1.479        |
| 1965 | 1880.5                      | 684.9    | 2.746                | 1.308                                                   | 1.444        |
| 1966 | 1035.0                      | 749.9    | 2.714                | 1.364                                                   | 1.421        |
| 1967 | 2192.8                      | 793.9    | 2.762                | 1.353                                                   | 1.452        |
| 1968 | 2364.0                      | 864.2    | 2.735                | 1.375                                                   | 1.447        |
| 1969 | NA                          | 930.3    | NA                   | 1.412                                                   | 1.471        |
| 1970 | NA                          | 977.1    | NA                   | 1.364                                                   | 1.536        |
| 1971 | NA                          | 1054.9   | NA                   | 1.318                                                   | 1.533        |
| 1972 | NA                          | 1158.0   | NA                   | 1.336                                                   | 1.487        |
| 1973 | NA                          | 1294.9   | NA                   | 1.392                                                   | 1.457        |
| 1974 | NA                          | 1397.3   | NA                   | 1.420                                                   | 1.555        |

\* see also Appendix Tables III.4. for Industry Capital/Output Ratios

1) Total Capital Stock represents Total Reproducible Assets (Equipment structures and Inventories, compiled from: Historical Statistics of the US Colonial Times to 1970, p.252 Table F 349-376 and 1975 Statistical Abstract of the U.S.

2) Dept. of Commerce, BEA: A Study of Fixed Capital Requirements

Appendix Table III.3. U.S. Capital Stock and Capital/GNP Ratios for the Business Economy, 1947-1974.

(Billions of 1958 dollars where applicable)

|      | (1)                                       | (2)                                        | (3)                                               | (4)                                  | (5)                                                             | (6)                                                           |
|------|-------------------------------------------|--------------------------------------------|---------------------------------------------------|--------------------------------------|-----------------------------------------------------------------|---------------------------------------------------------------|
|      | Total Gross<br>Capital<br>Stock <u>1/</u> | Capacity<br>Utilization<br>Rates <u>2/</u> | Utilized<br>Capital<br>Stock<br>(Col. 1 x Col. 2) | Private<br>Business<br>GNP <u>3/</u> | Capital/<br>Output<br>Ratios<br>(Adjusted)<br>(Col. 3 ÷ Col. 4) | Capital/<br>Output<br>Ratios<br>(Unadj.)<br>(Col. 1 ÷ Col. 4) |
| 1947 | 445.0                                     | .952                                       | 423.6                                             | 272.8                                | 1.553                                                           | 1.631                                                         |
| 1948 | 467.1                                     | .928                                       | 433.5                                             | 286.0                                | 1.516                                                           | 1.633                                                         |
| 1949 | 482.8                                     | .818                                       | 394.9                                             | 284.7                                | 1.387                                                           | 1.696                                                         |
| 1950 | 502.4                                     | .898                                       | 451.2                                             | 314.2                                | 1.436                                                           | 1.599                                                         |
| 1951 | 522.8                                     | .912                                       | 476.8                                             | 334.5                                | 1.425                                                           | 1.563                                                         |
| 1952 | 540.0                                     | .892                                       | 481.7                                             | 343.2                                | 1.404                                                           | 1.573                                                         |
| 1953 | 558.0                                     | .926                                       | 516.7                                             | 360.7                                | 1.433                                                           | 1.547                                                         |
| 1954 | 574.9                                     | .833                                       | 478.9                                             | 355.4                                | 1.348                                                           | 1.618                                                         |
| 1955 | 594.3                                     | .911                                       | 541.4                                             | 385.4                                | 1.405                                                           | 1.542                                                         |
| 1956 | 616.6                                     | .904                                       | 557.4                                             | 392.2                                | 1.421                                                           | 1.572                                                         |
| 1957 | 636.4                                     | .874                                       | 556.2                                             | 397.5                                | 1.399                                                           | 1.601                                                         |
| 1958 | 650.0                                     | .773                                       | 502.5                                             | 391.7                                | 1.283                                                           | 1.659                                                         |
| 1959 | 664.5                                     | .832                                       | 552.9                                             | 419.4                                | 1.318                                                           | 1.584                                                         |
| 1960 | 682.1                                     | .818                                       | 558.0                                             | 429.5                                | 1.299                                                           | 1.538                                                         |
| 1961 | 698.3                                     | .790                                       | 551.7                                             | 436.9                                | 1.263                                                           | 1.598                                                         |
| 1962 | 717.4                                     | .822                                       | 589.7                                             | 466.7                                | 1.264                                                           | 1.537                                                         |
| 1963 | 736.9                                     | .837                                       | 616.8                                             | 486.6                                | 1.263                                                           | 1.514                                                         |
| 1964 | 760.8                                     | .865                                       | 658.1                                             | 514.4                                | 1.279                                                           | 1.479                                                         |
| 1965 | 792.6                                     | .906                                       | 718.1                                             | 548.9                                | 1.308                                                           | 1.444                                                         |
| 1966 | 831.2                                     | .960                                       | 798.0                                             | 584.9                                | 1.364                                                           | 1.421                                                         |
| 1967 | 867.9                                     | .932                                       | 808.9                                             | 597.8                                | 1.353                                                           | 1.452                                                         |
| 1968 | 906.4                                     | .950                                       | 861.1                                             | 626.5                                | 1.375                                                           | 1.447                                                         |
| 1969 | 948.2                                     | .960                                       | 910.3                                             | 644.6                                | 1.412                                                           | 1.471                                                         |
| 1970 | 984.8                                     | .888                                       | 874.5                                             | 641.1                                | 1.364                                                           | 1.536                                                         |
| 1971 | 1,017.3                                   | .860                                       | 874.9                                             | 663.7                                | 1.318                                                           | 1.533                                                         |
| 1972 | 1,054.5                                   | .899                                       | 948.0                                             | 709.4                                | 1.336                                                           | 1.487                                                         |
| 1973 | 1,097.5                                   | .955                                       | 1,048.1                                           | 753.1                                | 1.392                                                           | 1.457                                                         |
| 1974 | 1,141.1 <sup>e</sup>                      | .913                                       | 1,041.8                                           | 733.8                                | 1.420                                                           | 1.555                                                         |

<sup>e</sup> Estimate from John Musgrave of BEA.

1/ BEA series - Constant cost 1, purchases of Government surplus assets at marginal acquisition prices, service lives: 85% of Bulletin F, Winfrey S-3 pattern from the March 1974 Survey of Current Business

2/ Wharton series which covers mining, manufacturing and utilities.

3/ From Survey of Current Business, Table 1.8

Source: U.S. Department of Commerce, Bureau of Economic Analysis, December 1975, p. 11.

Appendix Table III.4. U.S. Capital/Output Ratios at 80 Industry Level for Input-Output Aggregation, 1963 and 1967-1970.

| CR<br>Industry<br>Number | 1963  | 1967  | 1968  | 1969  | 1970  | Average<br>1967-70 | Method used to<br>derive 1970 capital/<br>output ratio |
|--------------------------|-------|-------|-------|-------|-------|--------------------|--------------------------------------------------------|
| 1-4                      | 1.240 | 1.271 | 1.293 | 1.304 | 1.307 | 1.295              | trend 1969-70                                          |
| 5                        | .651  | .743  | .934  | 1.037 | 1.128 | .961               | trend 1963-70                                          |
| 6                        | .731  | 1.097 | 1.195 | 1.177 | 1.176 | 1.161              | 1970                                                   |
| 7                        | .934  | 1.224 | 1.265 | 1.251 | 1.295 | 1.259              | average*                                               |
| 8                        | 5.630 | 5.002 | 4.947 | 4.882 | 4.732 | 4.891              | special*                                               |
| 9                        | .671  | .853  | .856  | .806  | .803  | .832               | 1970                                                   |
| 10                       | .673  | .807  | .887  | 1.062 | .906  | .916               | average                                                |
| 11-12                    | .124  | .143  | .141  | .145  | .146  | .144               | 1970                                                   |
| 13                       | .140  | .129  | .122  | .134  | .178  | .141               | average                                                |
| 14                       | .232  | .222  | .226  | .228  | .232  | .227               | 1970                                                   |
| 15                       | .091  | .100  | .101  | .106  | .107  | .104               | trend 1963-70                                          |
| 16                       | .352  | .364  | .367  | .365  | .357  | .363               | average                                                |
| 17                       | .304  | .276  | .262  | .255  | .271  | .266               | 1970                                                   |
| 18a                      | .423  | .322  | .311  | .284  | .269  | .297               | trend 1963-70                                          |
| 18b                      | .087  | .085  | .092  | .093  | .100  | .093               | 1970                                                   |
| 19                       | .160  | .138  | .143  | .134  | .141  | .139               | 1970                                                   |
| 20-21                    | .380  | .359  | .367  | .376  | .360  | .366               | average                                                |
| 22                       | .201  | .205  | .204  | .211  | .212  | .208               | 1970                                                   |
| 23                       | .260  | .218  | .233  | .224  | .235  | .228               | average                                                |
| 24                       | .720  | .843  | .837  | .832  | .864  | .844               | average                                                |
| 25                       | .378  | .426  | .429  | .444  | .451  | .438               | trend 1967-70                                          |
| 26a                      | .374  | .332  | .325  | .318  | .340  | .329               | average                                                |
| 26b                      | .334  | .358  | .355  | .360  | .379  | .363               | 1970                                                   |
| 27a                      | .674  | .710  | .694  | .689  | .707  | .700               | average                                                |
| 27b                      | .379  | .455  | .468  | .504  | .536  | .491               | trend 1967-70                                          |
| 28                       | .621  | .703  | .619  | .631  | .671  | .656               | average                                                |
| 29                       | .270  | .253  | .247  | .250  | .249  | .250               | 1970                                                   |
| 30                       | .191  | .227  | .235  | .252  | .259  | .243               | trend 1963-70                                          |
| 31                       | .585  | .541  | .522  | .522  | .511  | .524               | trend 1963-70*                                         |
| 32                       | .363  | .443  | .414  | .400  | .401  | .415               | 1970 - ...                                             |
| 33-34                    | .137  | .124  | .125  | .128  | .135  | .128               | 1970                                                   |
| 35                       | .639  | .616  | .637  | .647  | .684  | .646               | 1970                                                   |
| 36a                      | .838  | .776  | .782  | .793  | .797  | .787               | 1970                                                   |
| 36b                      | .507  | .459  | .458  | .462  | .494  | .468               | 1970                                                   |
| 37a                      | .965  | .952  | .949  | .965  | 1.012 | .970               | average                                                |
| 37b                      | .346  | .376  | .388  | .400  | .454  | .405               | trend 1967-70                                          |
| 38a                      | .368  | .431  | .399  | .369  | .413  | .403               | average                                                |
| 38b                      | .313  | .372  | .380  | .390  | .441  | .396               | trend 1963-70                                          |
| 38c                      | .304  | .347  | .357  | .391  | .463  | .390               | trend 1967-70                                          |
| 39                       | .387  | .379  | .367  | .382  | .362  | .373               | average                                                |
| 40                       | .284  | .271  | .274  | .280  | .287  | .278               | 1970                                                   |
| 41                       | .396  | .310  | .301  | .333  | .382  | .332               | 1970                                                   |
| 42                       | .291  | .305  | .304  | .317  | .335  | .315               | 1970                                                   |

Appendix Table III.4. (continued)

| Industry<br>Number<br>** | 1963  | 1967  | 1968  | 1969  | 1970  | Average<br>1967-70 | Method used to<br>derive 1980 capital/<br>output ratio |
|--------------------------|-------|-------|-------|-------|-------|--------------------|--------------------------------------------------------|
| 43                       | .289  | .331  | .323  | .308  | .328  | .323               | 1970                                                   |
| 44                       | .252  | .288  | .305  | .333  | .333  | .315               | 1970                                                   |
| 45                       | .248  | .319  | .322  | .322  | .326  | .322               | 1970                                                   |
| 46                       | .178  | .207  | .211  | .200  | .211  | .207               | 1970                                                   |
| 47                       | .329  | .377  | .407  | .408  | .441  | .408               | trend 1967-70                                          |
| 48                       | .222  | .292  | .301  | .301  | .322  | .304               | trend 1967-70                                          |
| 49                       | .247  | .336  | .361  | .357  | .376  | .358               | 1970                                                   |
| 50                       | .253  | .304  | .348  | .369  | .384  | .351               | trend 1963-70                                          |
| 51                       | .219  | .250  | .240  | .228  | .237  | .239               | 1970                                                   |
| 52                       | .197  | .211  | .207  | .188  | .199  | .201               | 1970                                                   |
| 53                       | .256  | .236  | .249  | .252  | .261  | .250               | 1970                                                   |
| 54                       | .222  | .224  | .212  | .213  | .214  | .216               | 1970                                                   |
| 55                       | .218  | .235  | .235  | .234  | .243  | .237               | average                                                |
| 56                       | .165  | .178  | .178  | .191  | .209  | .189               | trend 1967-70                                          |
| 57                       | .260  | .250  | .280  | .285  | .304  | .280               | 1970                                                   |
| 58                       | .194  | .203  | .209  | .214  | .220  | .212               | trend 1967-70                                          |
| 59                       | .191  | .221  | .200  | .197  | .206  | .206               | 1970                                                   |
| 60                       | .189  | .205  | .198  | .217  | .230  | .213               | average                                                |
| 61                       | n.a.  | .165  | .149  | .152  | .154  | .155               | 1970                                                   |
| 62                       | .225  | .227  | .227  | .225  | .233  | .228               | 1970                                                   |
| 63                       | .324  | .271  | .274  | .256  | .266  | .267               | 1970                                                   |
| 64                       | .203  | .205  | .211  | .207  | .212  | .209               | 1970                                                   |
| 65a                      | 5.255 | 4.998 | 5.063 | 5.033 | 4.876 | 5.005              | average*                                               |
| 65b                      | 2.300 | 2.563 | 2.601 | 2.566 | 2.658 | 2.597              | 1970*                                                  |
| 65c                      | .880  | .900  | .892  | .952  | 1.045 | .947               | 1970*                                                  |
| 65d                      | 3.092 | 2.628 | 2.558 | 2.595 | 2.176 | 2.489              | average*                                               |
| 65e                      | 1.318 | 1.120 | 1.153 | 1.155 | 1.267 | 1.174              | 1970*                                                  |
| 65f                      | 4.403 | 3.951 | 4.018 | 3.875 | 3.850 | 3.924              | average*                                               |
| 66                       | 2.720 | 2.494 | 2.504 | 2.429 | 2.458 | 2.471              | average*                                               |
| 67                       | .596  | .749  | .729  | .782  | .791  | .763               | 1970                                                   |
| 68a <sup>1/</sup>        | 4.846 | 4.659 | 4.642 | 4.709 | 4.714 | 4.681              | special*                                               |
| 68b                      | 2.083 | 1.974 | 2.016 | 2.023 | 1.994 | 2.002              | average*                                               |
| 68c                      | .965  | .980  | .956  | 1.008 | 1.020 | .991               | 1970                                                   |
| 69a                      | .311  | .313  | .319  | .313  | .314  | .315               | 1970                                                   |
| 69b                      | .595  | .626  | .635  | .634  | .628  | .631               | 1970                                                   |
| 70                       | .477  | .498  | .493  | .529  | .547  | .517               | 1970                                                   |
| 71                       | .442  | .411  | .414  | .419  | .420  | .416               | 1970                                                   |
| 72                       | 1.232 | 1.207 | 1.226 | 1.241 | 1.174 | 1.212              | average                                                |
| 73                       | .253  | .261  | .311  | .337  | .357  | .317               | trend 1969-70                                          |
| 75                       | .641  | .671  | .729  | .749  | .795  | .736               | trend 1967-70                                          |
| 76                       | 1.221 | 1.480 | 1.473 | 1.672 | 1.727 | 1.588              | 1970                                                   |
| 77                       | 1.600 | 1.655 | 1.652 | 1.652 | 1.655 | 1.655              | 1970                                                   |

\*See Dept. of Commerce Study, methodological appendix on major producing and consuming industries.

<sup>1</sup>To compute the capital/output ratios for this industry, the output of government enterprises was excluded since the stock figures did not include government-owned capital.

\*\*See Appendix Table III.7. U.S. Industry Classification

Source: U.S. Depart. of Commerce, Bureau of Economic Analysis, December 1975, p. 48-49.



Appendix Table III.5. U.S. Capital/Output Ratios, 1963 and 1967-1970 for Selected Industries\*, adjusted for capacity utilization.

| Industry Number** | 1963  | 1967  | 1968  | 1969  | 1970  | Growth Rate | Trend Period |
|-------------------|-------|-------|-------|-------|-------|-------------|--------------|
| 1-4               | 1.022 | 1.051 | 1.077 | 1.086 | 1.094 | 0.7         | 1969-1970    |
| 5                 | .489  | .626  | .788  | .873  | .949  | 9.9         | 1963-1970    |
| 15                | .085  | .090  | .090  | .095  | .096  | 1.8         | 1963-1970    |
| 18a               | .388  | .288  | .276  | .252  | .238  | -6.7        | 1963-1970    |
| 25                | .347  | .381  | .382  | .395  | .400  | 1.6         | 1967-1970    |
| 27b               | .351  | .403  | .418  | .450  | .477  | 5.3         | 1967-1970    |
| 30                | .179  | .208  | .215  | .230  | .235  | 4.0         | 1963-1970    |
| 31                | .588  | .532  | .509  | .507  | .494  | -2.5        | 1963-1970    |
| 37b               | .319  | .338  | .347  | .357  | .405  | 6.2         | 1967-1970    |
| 38b               | .289  | .332  | .338  | .347  | .391  | 4.4         | 1963-1970    |
| 38c               | .289  | .319  | .326  | .355  | .418  | 9.4         | 1967-1970    |
| 47                | .292  | .332  | .357  | .358  | .387  | 5.2         | 1967-1970    |
| 48                | .200  | .260  | .268  | .268  | .286  | 3.2         | 1967-1970    |
| 50                | .221  | .267  | .305  | .325  | .338  | 6.3         | 1963-1970    |
| 56                | .154  | .162  | .162  | .173  | .189  | 5.3         | 1967-1970    |
| 58                | .167  | .175  | .181  | .186  | .191  | 3.0         | 1967-1970    |
| 73                | .201  | .257  | .307  | .334  | .354  | 6.0         | 1969-1970    |
| 75                | .493  | .613  | .668  | .687  | .730  | 6.0         | 1967-1970    |
| 8 <sup>1/</sup>   | 4.054 | 3.877 | 3.824 | 3.767 | 3.633 | -2.1        | 1967-1970    |

\*Industries for which a trend was used to project 1980 C/O ratios.

\*\*See appendix Table III.6. U.S. Industry Classification

1/Because of "special energy" considerations, the negative trend for this industry was not projected to 1980.

Source: U.S. Department of Commerce, Bureau of Economic Analysis, December 1975, p.51.

Appendix Table III. 6.

U.S. Required Level of 1980 Capital Stock for Production of Full Employment GNP  
(Fixed 1970 Capital/Output Ratios)

|                                | (1)                              | (2)                                       | (3)                                                             | (4)                                           | (5)                                                                  | (6)                                                                  |
|--------------------------------|----------------------------------|-------------------------------------------|-----------------------------------------------------------------|-----------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------------------|
| CR<br>Industry<br>Number<br>** | Proj. 1980<br>Outputs<br>1967 \$ | Fixed 1970<br>Capital/<br>Output<br>Ratio | Required<br>1980 Capital<br>Stock<br>(Col.1 x Col.2)<br>(58 \$) | 1970<br>Capital Stock<br>(Scaled)*<br>(58 \$) | Diff. in<br>Capital Stock<br>1970-1980<br>(Col.3 - Col.4)<br>(58 \$) | Ratio<br>1980 Capital Stock<br>1970 Capital Stock<br>(Col.3 ÷ Col.4) |
| 1-4                            | 77,776                           | 1.094                                     | 85,087                                                          | 70,525                                        | 14,562                                                               | 1.206                                                                |
| 5                              | 1,554                            | .949                                      | 1,475                                                           | 1,257                                         | 218                                                                  | 1.173                                                                |
| 6                              | 2,795                            | 1.022                                     | 2,856                                                           | 2,085                                         | 771                                                                  | 1.370                                                                |
| 7                              | 4,934                            | 1.174                                     | 5,793                                                           | 4,211                                         | 1,582                                                                | 1.376                                                                |
| 8                              | 13,059                           | 3.633                                     | 47,443                                                          | 58,514                                        | -11,071                                                              | .811                                                                 |
| 9                              | 3,188                            | .747                                      | 2,381                                                           | 2,121                                         | 260                                                                  | 1.123                                                                |
| 10                             | 1,466                            | .835                                      | 1,224                                                           | 901                                           | 323                                                                  | 1.358                                                                |
| 11-12                          | 134,942                          | .140                                      | 18,828                                                          | 17,118                                        | 1,710                                                                | 1.100                                                                |
| 13                             | 7,451                            | .156                                      | 1,162                                                           | 1,594                                         | -432                                                                 | .729                                                                 |
| 14                             | 115,153                          | .210                                      | 24,183                                                          | 21,818                                        | 2,365                                                                | 1.108                                                                |
| 15                             | 8,960                            | .096                                      | 860                                                             | 843                                           | 17                                                                   | 1.020                                                                |
| 16                             | 23,372                           | .316                                      | 7,386                                                           | 5,928                                         | 1,458                                                                | 1.246                                                                |
| 17                             | 9,518                            | .242                                      | 2,303                                                           | 1,440                                         | 863                                                                  | 1.599                                                                |
| 18a                            | 9,384                            | .238                                      | 2,233                                                           | 1,626                                         | 607                                                                  | 1.373                                                                |
| 18b                            | 28,167                           | .089                                      | 2,507                                                           | 1,966                                         | 541                                                                  | 1.275                                                                |
| 19                             | 8,708                            | .127                                      | 1,106                                                           | 742                                           | 364                                                                  | 1.491                                                                |
| 20-21                          | 20,402                           | .319                                      | 6,508                                                           | 4,818                                         | 1,690                                                                | 1.351                                                                |
| 22                             | 8,406                            | .194                                      | 1,631                                                           | 1,322                                         | 309                                                                  | 1.234                                                                |
| 23                             | 4,284                            | .216                                      | 925                                                             | 761                                           | 164                                                                  | 1.216                                                                |
| 24                             | 26,517                           | .755                                      | 20,020                                                          | 14,109                                        | 5,911                                                                | 1.419                                                                |
| 25                             | 9,703                            | .400                                      | 3,883                                                           | 2,895                                         | 988                                                                  | 1.341                                                                |
| 26a                            | 18,763                           | .308                                      | 5,779                                                           | 4,368                                         | 1,411                                                                | 1.323                                                                |
| 26b                            | 16,033                           | .333                                      | 5,339                                                           | 3,882                                         | 1,457                                                                | 1.375                                                                |
| 27a                            | 35,056                           | .621                                      | 21,770                                                          | 16,197                                        | 5,573                                                                | 1.344                                                                |
| 27b                            | 3,791                            | .477                                      | 1,808                                                           | 1,470                                         | 338                                                                  | 1.230                                                                |
| 28                             | 21,271                           | .585                                      | 12,444                                                          | 6,767                                         | 5,677                                                                | 1.839                                                                |
| 29                             | 27,030                           | .226                                      | 6,109                                                           | 3,829                                         | 2,280                                                                | 1.595                                                                |
| 30                             | 4,414                            | .235                                      | 1,037                                                           | 783                                           | 254                                                                  | 1.324                                                                |
| 31                             | 35,368                           | .494                                      | 17,472                                                          | 15,027                                        | 2,445                                                                | 1.163                                                                |
| 32                             | 35,247                           | .350                                      | 12,336                                                          | 6,517                                         | 5,819                                                                | 1.893                                                                |
| 33-34                          | 4,402                            | .123                                      | 541                                                             | 707                                           | -166                                                                 | .765                                                                 |
| 35                             | 6,054                            | .603                                      | 3,651                                                           | 2,821                                         | 830                                                                  | 1.294                                                                |
| 36a                            | 10,013                           | .712                                      | 7,129                                                           | 6,266                                         | 863                                                                  | 1.138                                                                |
| 36b                            | 4,823                            | .441                                      | 2,127                                                           | 2,120                                         | 7                                                                    | 1.003                                                                |
| 37a                            | 27,381                           | .926                                      | 25,355                                                          | 24,860                                        | 495                                                                  | 1.020                                                                |
| 37b                            | 8,876                            | .405                                      | 3,595                                                           | 3,186                                         | 409                                                                  | 1.128                                                                |
| 38a                            | 13,343                           | .374                                      | 4,990                                                           | 3,046                                         | 1,944                                                                | 1.638                                                                |
| 38b                            | 15,633                           | .391                                      | 6,113                                                           | 4,245                                         | 1,868                                                                | 1.440                                                                |
| 38c                            | 3,060                            | .418                                      | 1,279                                                           | 1,011                                         | 268                                                                  | 1.265                                                                |
| 39                             | 5,532                            | .309                                      | 1,709                                                           | 1,463                                         | 246                                                                  | 1.168                                                                |
| 40                             | 19,483                           | .252                                      | 4,910                                                           | 3,855                                         | 1,055                                                                | 1.274                                                                |
| 41                             | 9,132                            | .333                                      | 3,041                                                           | 3,352                                         | -311                                                                 | .907                                                                 |
| 42                             | 19,790                           | .296                                      | 5,858                                                           | 4,355                                         | 1,503                                                                | 1.345                                                                |
| 43                             | 8,307                            | .285                                      | 2,367                                                           | 1,448                                         | 919                                                                  | 1.635                                                                |
| 44                             | 7,663                            | .294                                      | 2,253                                                           | 1,293                                         | 960                                                                  | 1.742                                                                |
| 45                             | 11,384                           | .288                                      | 3,279                                                           | 1,973                                         | 1,306                                                                | 1.662                                                                |
| 46                             | 4,347                            | .194                                      | 843                                                             | 563                                           | 280                                                                  | 1.497                                                                |
| 47                             | 11,329                           | .387                                      | 4,384                                                           | 3,149                                         | 1,235                                                                | 1.392                                                                |
| 48                             | 7,631                            | .286                                      | 2,182                                                           | 1,619                                         | 563                                                                  | 1.348                                                                |
| 49                             | 14,300                           | .333                                      | 4,762                                                           | 2,683                                         | 2,079                                                                | 1.775                                                                |
| 50                             | 5,754                            | .338                                      | 1,945                                                           | 1,304                                         | 641                                                                  | 1.492                                                                |
| 51                             | 15,956                           | .210                                      | 3,351                                                           | 2,008                                         | 1,343                                                                | 1.669                                                                |
| 52                             | 14,100                           | .179                                      | 2,524                                                           | 1,250                                         | 1,274                                                                | 2.019                                                                |
| 53                             | 16,112                           | .236                                      | 3,602                                                           | 2,806                                         | 796                                                                  | 1.284                                                                |
| 54                             | 11,122                           | .192                                      | 2,135                                                           | 1,393                                         | 742                                                                  | 1.533                                                                |
| 55                             | 8,030                            | .214                                      | 1,718                                                           | 1,131                                         | 587                                                                  | 1.519                                                                |
| 56                             | 26,445                           | .189                                      | 4,998                                                           | 3,771                                         | 1,227                                                                | 1.325                                                                |
| 57                             | 16,816                           | .269                                      | 4,524                                                           | 2,676                                         | 1,848                                                                | 1.691                                                                |
| 58                             | 6,536                            | .191                                      | 1,248                                                           | 752                                           | 496                                                                  | 1.660                                                                |

Appendix Table III.6 continued.

|                          | (1)                              | (2)                                       | (3)                                                             | (4)                                          | (5)                                                                  | (6)                                                                  |
|--------------------------|----------------------------------|-------------------------------------------|-----------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------------------|
| CR<br>Industry<br>Number | Proj. 1980<br>Outputs<br>1967 \$ | Fixed 1970<br>Capital/<br>Output<br>Ratio | Required<br>1980 Capital<br>Stock<br>(Col.1 x Col.2)<br>(58 \$) | 1970<br>Capital Stock<br>(Scaled)<br>(58 \$) | Diff. in<br>Capital Stock<br>1970-1980<br>(Col.3 - Col.4)<br>(58 \$) | Ratio<br>1980 Capital Stock<br>1970 Capital Stock<br>(Col.3 ÷ Col.4) |
| 59                       | 80,004                           | .182                                      | 14,561                                                          | 10,165                                       | 4,396                                                                | 1.433                                                                |
| 60                       | 21,912                           | .204                                      | 4,470                                                           | 5,191                                        | -721                                                                 | .861                                                                 |
| 61                       | 18,167                           | .140                                      | 2,543                                                           | 1,652                                        | 891                                                                  | 1.539                                                                |
| 62                       | 10,289                           | .212                                      | 2,181                                                           | 1,597                                        | 584                                                                  | 1.366                                                                |
| 63                       | 10,617                           | .241                                      | 2,559                                                           | 1,603                                        | 951                                                                  | 1.591                                                                |
| 64                       | 15,998                           | .161                                      | 2,576                                                           | 1,872                                        | 704                                                                  | 1.376                                                                |
| 65a                      | 15,511                           | 4.262                                     | 66,102                                                          | 58,759                                       | 7,349                                                                | 1.125                                                                |
| 65b                      | 5,181                            | 2.178                                     | 11,284                                                          | 9,433                                        | 1,851                                                                | 1.196                                                                |
| 65c                      | 26,257                           | .969                                      | 25,443                                                          | 20,285                                       | 5,158                                                                | 1.254                                                                |
| 65d                      | 6,233                            | 2.208                                     | 13,762                                                          | 15,301                                       | -1,539                                                               | .899                                                                 |
| 65e                      | 21,075                           | 1.279                                     | 26,955                                                          | 17,492                                       | 9,463                                                                | 1.541                                                                |
| 65f                      | 3,353                            | 3.189                                     | 10,693                                                          | 8,011                                        | 2,682                                                                | 1.335                                                                |
| 66                       | 46,296                           | 2.207                                     | 102,175                                                         | 54,159                                       | 48,016                                                               | 1.827                                                                |
| 67                       | 3,853                            | .698                                      | 2,689                                                           | 2,502                                        | 187                                                                  | 1.075                                                                |
| 68a                      | 48,666                           | 3.946                                     | 192,036                                                         | 82,727                                       | 109,309                                                              | 2.321                                                                |
| 68b                      | 16,150                           | 1.515                                     | 24,467                                                          | 25,304                                       | -837                                                                 | .967                                                                 |
| 68c                      | 5,172                            | .769                                      | 3,977                                                           | 3,048                                        | 929                                                                  | 1.305                                                                |
| 69a                      | 121,363                          | .274                                      | 33,253                                                          | 21,036                                       | 12,217                                                               | 1.581                                                                |
| 69b                      | 166,057                          | .549                                      | 91,165                                                          | 64,230                                       | 26,935                                                               | 1.419                                                                |
| 70                       | 86,906                           | .438                                      | 38,065                                                          | 22,668                                       | 15,397                                                               | 1.679                                                                |
| 71                       | 180,623                          | .325                                      | 58,702                                                          | 40,831                                       | 17,871                                                               | 1.438                                                                |
| 72                       | 23,117                           | .922                                      | 21,314                                                          | 31,482                                       | -10,168                                                              | .677                                                                 |
| 73                       | 87,061                           | .354                                      | 30,820                                                          | 21,059                                       | 9,761                                                                | 1.464                                                                |
| 75                       | 21,653                           | .730                                      | 15,807                                                          | 11,765                                       | 4,042                                                                | 1.344                                                                |
| 76                       | 13,184                           | 1.451                                     | 19,130                                                          | 14,278                                       | 4,852                                                                | 1.340                                                                |
| 77                       | 94,266                           | 1.272                                     | 119,906                                                         | 71,773                                       | 48,133                                                               | 1.671                                                                |
| Total                    | 2,199,043                        | -----                                     | 1,376,942                                                       | 984,768                                      | 392,174                                                              | -----                                                                |

\* = Adjusted for Capacity Utilization

\*\* = See Appendix Table III.7. U.S. Industry Classification

Source: U.S. Department of Commerce  
Bureau of Economic Analysis  
December 1975

Appendix Table III.7: U.S. Industry Classification

Industry Classification for Capital Requirements Study

| Capital<br>Requirement<br>Industry<br>Number <sup>1/</sup> | Title                                                 |
|------------------------------------------------------------|-------------------------------------------------------|
| 1-4                                                        | Agriculture, Forestry and fishery                     |
| 5                                                          | Iron and ferroalloy ores mining                       |
| 6                                                          | Nonferrous metal ores mining                          |
| 7                                                          | Coal mining                                           |
| 8                                                          | Crude petroleum and natural gas                       |
| 9                                                          | Stone and clay mining and quarrying                   |
| 10                                                         | Chemicals and fertilizer mineral mining               |
| 11-12                                                      | New and maintenance construction                      |
| <del>13</del>                                              | <del>Ordnance and accessories</del>                   |
| 14                                                         | Food and kindred products                             |
| 15                                                         | Tobacco manufactures                                  |
| 16                                                         | Broad and narrow fabrics, yarn and thread mills       |
| 17                                                         | Miscellaneous textile goods and floor coverings       |
| 18a                                                        | Hosiery and knit goods                                |
| 18b                                                        | Apparel                                               |
| 19                                                         | Miscellaneous fabricated textile products             |
| 20-21                                                      | Lumber, wood products and wooden containers           |
| 22                                                         | Household furniture                                   |
| 23                                                         | Other furniture and fixtures                          |
| 24                                                         | Paper and allied products except containers and boxes |
| 25                                                         | Paperboard containers and boxes                       |
| 26a                                                        | Newspapers, periodicals and book publishing           |
| <del>26b</del>                                             | <del>Commercial printing</del>                        |
| 27a                                                        | Industrial chemicals                                  |
| 27b                                                        | Fertilizers and agricultural chemicals                |
| 28                                                         | Plastics and synthetic materials                      |
| 29                                                         | Drugs, cleaning and toilet preparations               |
| 30                                                         | Paints and allied products                            |

Appendix Table III.7 continued

Industry Classification for Capital Requirements Study

| Capital<br>Requirement<br>Industry<br>Number | Title                                                                                |
|----------------------------------------------|--------------------------------------------------------------------------------------|
| 31                                           | Petroleum refining and related industries                                            |
| 32                                           | Rubber and miscellaneous plastics products                                           |
| 33-34                                        | Leather, footwear and leather products                                               |
| 35                                           | Glass and glass products                                                             |
| 36a                                          | Cement, clay and concrete products                                                   |
| 36b                                          | Miscellaneous stone and clay products                                                |
| 37a                                          | Blast furnaces and basic steel products                                              |
| 37b                                          | Iron and steel foundries and forgings                                                |
| 38a                                          | Primary nonferrous metals                                                            |
| 38b                                          | Nonferrous rolling and drawing                                                       |
| 38c                                          | Miscellaneous nonferrous metal products                                              |
| 39                                           | Metal containers                                                                     |
| 40                                           | Heating, plumbing, and fabricated structural metal products                          |
| 41                                           | Screw machine products, bolts, nuts, etc. and metal stampings                        |
| 42                                           | Other fabricated metal products                                                      |
| 43                                           | Engines and turbines                                                                 |
| 44                                           | Farm machinery                                                                       |
| 45                                           | Construction, mining, oil field machinery equipment                                  |
| 46                                           | Materials handling machinery and equipment                                           |
| 47                                           | Metalworking machinery and equipment                                                 |
| 48                                           | Special industry machinery and equipment                                             |
| 49                                           | General industrial machinery and equipment                                           |
| 50                                           | Machine shop products                                                                |
| 51                                           | Office, computing, and accounting machines                                           |
| 52                                           | Service industry machines                                                            |
| 53                                           | Electric transmission and distribution equipment and electrical industrial apparatus |

Appendix Table III.7 continued

Industry Classification for Capital Requirements Study

| Capital<br>Requirement<br>Industry<br>Number <u>1/</u> | Title                                                                 |
|--------------------------------------------------------|-----------------------------------------------------------------------|
| 54                                                     | Household appliances                                                  |
| 55                                                     | Electric lighting and wiring equipment                                |
| 56                                                     | Radio, television and communication equipment                         |
| 57                                                     | Electronic components and accessories                                 |
| 58                                                     | Miscellaneous electrical machinery, equipment<br>and supplies         |
| 59                                                     | Motor vehicles and equipment                                          |
| 60                                                     | Aircraft and parts                                                    |
| 61                                                     | Other transportation equipment                                        |
| 62                                                     | Professional, scientific and controlling<br>instruments, and supplies |
| 63                                                     | Optical, ophthalmic and photographic<br>equipment and supplies        |
| 64                                                     | Miscellaneous manufacturing                                           |
| 65a                                                    | Railroad transportation                                               |
| 65b                                                    | Local transit and intercity bus                                       |
| 65c                                                    | Truck transportation and warehousing                                  |
| 65d                                                    | Water transportation                                                  |
| 65e                                                    | Air transportation                                                    |
| 65f                                                    | Pipeline and other transportation services                            |
| 66                                                     | Communications, except radio and television<br>broadcasting           |
| 67                                                     | Radio and television broadcasting                                     |
| 68a                                                    | Electric utilities                                                    |
| 68b                                                    | Gas utilities                                                         |
| 68c                                                    | Water and sanitary services                                           |
| 69a                                                    | Wholesale trade                                                       |
| 69b                                                    | Retail trade                                                          |

Appendix Table III.7 continued

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Industry Classification for Capital Requirements Study

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| Capital<br>Requirement<br>Industry<br>Number <sup>1/</sup> | Title                                                                                |
|------------------------------------------------------------|--------------------------------------------------------------------------------------|
| 70                                                         | Finance and insurance                                                                |
| 71                                                         | Real estate and rental                                                               |
| 72                                                         | Hotels and lodging places, personal and repair<br>services, except automobile repair |
| 73                                                         | Business services                                                                    |
| 75                                                         | Automobile repair and services                                                       |
| 76                                                         | Amusements                                                                           |
| 77                                                         | Medical, educational services, and nonprofit<br>organizations                        |

<sup>1</sup> Does not include industries 78-87 because these industries do not generate any direct requirements for private fixed capital.

Source: U.S. Department of Commerce  
Bureau of Economic Analysis  
December 1975

Appendix Table III.8

F.R.G. Capital Stock/GDP output ratios, by major sectors of the Economy, 1950-1974 (Based on Capital Stock and GDP in constant Prices of 1962)

| Year  | Thereof:             |                                                                 |                                                                |                                |
|-------|----------------------|-----------------------------------------------------------------|----------------------------------------------------------------|--------------------------------|
|       | All Economic Sectors | Enterprises, including Agriculture, Forestry, Fishery, Dwelling | Enterprises, excluding Agriculture Forestry, Fishery, Dwelling | Agriculture, Forestry, Fishery |
| 1950* | 4.3                  | 4.0                                                             | 2.3                                                            | 4.2                            |
| 1951* | 4.0                  | 3.7                                                             | 2.1                                                            | 3.7                            |
| 1952* | 3.9                  | 3.5                                                             | 2.0                                                            | 3.7                            |
| 1953* | 3.7                  | 3.4                                                             | 1.9                                                            | 3.8                            |
| 1954* | 3.6                  | 3.3                                                             | 1.8                                                            | 3.8                            |
| 1955* | 3.4                  | 3.1                                                             | 1.7                                                            | 3.9                            |
| 1956* | 3.3                  | 3.0                                                             | 1.7                                                            | 4.1                            |
| 1957* | 3.4                  | 3.0                                                             | 1.7                                                            | 4.1                            |
| 1958* | 3.4                  | 3.1                                                             | 1.7                                                            | 4.0                            |
| 1959* | 3.4                  | 3.1                                                             | 1.7                                                            | 4.0                            |
| 1960* | 3.3                  | 3.0                                                             | 1.7                                                            | 4.0                            |
| 1960  | 3.3                  | 3.0                                                             | 1.7                                                            | 4.0                            |
| 1961  | 3.3                  | 3.0                                                             | 1.7                                                            | 4.2                            |
| 1962  | 3.4                  | 3.1                                                             | 1.8                                                            | 4.5                            |
| 1963  | 3.5                  | 3.2                                                             | 1.9                                                            | 4.5                            |
| 1964  | 3.5                  | 3.1                                                             | 1.9                                                            | 4.4                            |
| 1965  | 3.5                  | 3.1                                                             | 1.9                                                            | 5.1                            |
| 1966  | 3.6                  | 3.2                                                             | 2.0                                                            | 5.2                            |
| 1967  | 3.8                  | 3.4                                                             | 2.1                                                            | 4.8                            |
| 1968  | 3.8                  | 3.3                                                             | 2.0                                                            | 4.8                            |
| 1969  | 3.7                  | 3.2                                                             | 2.0                                                            | 5.1                            |
| 1970  | 3.6                  | 3.2                                                             | 2.0                                                            | 5.1                            |
| 1971  | 3.7                  | 3.3                                                             | 2.1                                                            | 5.0                            |
| 1972p | 3.8                  | 3.4                                                             | 2.1                                                            | 5.2                            |
| 1973p | 3.8                  | 3.4                                                             | 2.2                                                            | 5.1                            |
| 1974p | 4.0                  | 3.5                                                             | 2.3                                                            | 4.8                            |

\* = excluding Saar and Berlin

p = preliminary

Source: Compiled from H.Lützel, "Das Reproduzierbare Anlagevermögen" in Wirtschaft und Statistik 1971/10, Tables 5 and 6, p.10 and 1975 Statistisches Jahrbuch p.521.



Appendix Table III.9. F.R.G. Capital Output Ratios for 19 Activities, 1950-1972

|      | 1    | 2    | 3    | 4    | 5    | 6    | 7   | 8    | 9    | 10   | 11   | 12  | 13   | 14   | 15   | 16   | 17    | 18   | 19   | 20   |
|------|------|------|------|------|------|------|-----|------|------|------|------|-----|------|------|------|------|-------|------|------|------|
| 1950 | 2.68 | 4.22 | 1.43 | 1.75 | 1.25 | 1.74 | .37 | 1.55 | 1.73 | 3.20 | .83  | .87 | 1.33 | .40  | .85  | 4.75 | 37.38 | 2.33 | 1.00 | 2.76 |
| 1951 | 2.58 | 3.56 | 1.33 | 1.46 | 1.13 | 1.79 | .35 | 1.50 | 1.63 | 2.23 | 1.02 | .78 | 1.16 | .40  | .86  | 4.41 | 34.09 | 2.45 | 1.02 | 2.61 |
| 1952 | 2.46 | 3.75 | 1.47 | 1.41 | 1.08 | 1.41 | .36 | 1.41 | 1.45 | 2.16 | .94  | .68 | 1.05 | .40  | .85  | 4.31 | 31.40 | 2.54 | 1.00 | 2.51 |
| 1953 | 2.46 | 3.85 | 2.12 | 1.31 | .94  | 1.50 | .33 | 1.29 | 1.35 | 2.39 | .91  | .68 | 1.04 | .37  | .84  | 4.29 | 33.22 | 2.73 | 1.00 | 2.46 |
| 1954 | 2.49 | 3.77 | 2.17 | 1.26 | .94  | 1.29 | .33 | 1.19 | 1.33 | 2.22 | .84  | .62 | 1.01 | .40  | .83  | 4.23 | 33.74 | 2.89 | 1.03 | 2.43 |
| 1955 | 2.43 | 3.74 | 2.59 | 1.16 | .91  | 1.25 | .32 | 1.14 | 1.35 | 2.24 | .89  | .56 | .89  | .40  | .83  | 3.80 | 33.33 | 2.96 | .96  | 2.35 |
| 1956 | 2.57 | 3.72 | 1.97 | 1.21 | .91  | 1.26 | .33 | 1.17 | 1.41 | 2.21 | .60  | .60 | 1.09 | .44  | .84  | 3.76 | 33.32 | 3.09 | .98  | 2.37 |
| 1957 | 2.66 | 3.54 | 1.71 | 1.23 | .85  | 1.21 | .34 | 1.20 | 1.42 | 2.62 | .74  | .64 | .95  | .50  | .85  | 3.82 | 32.20 | 3.11 | 1.02 | 2.41 |
| 1958 | 2.75 | 4.06 | 1.60 | 1.31 | .96  | 1.32 | .36 | 1.21 | 1.55 | 2.00 | 1.11 | .62 | 1.03 | .55  | .92  | 3.90 | 31.67 | 3.27 | 1.05 | 2.50 |
| 1959 | 2.67 | 4.29 | 1.46 | 1.24 | .93  | 1.41 | .39 | 1.16 | 1.52 | 2.51 | .83  | .62 | 1.07 | .55  | .96  | 3.83 | 31.35 | 3.52 | 1.10 | 2.50 |
| 1960 | 2.99 | 4.54 | 1.32 | 1.23 | .98  | 1.38 | .40 | 1.13 | 1.56 | 2.13 | 1.05 | .58 | .96  | .61  | 1.01 | 3.71 | 29.42 | 3.64 | 1.15 | 2.45 |
| 1961 | 3.53 | 4.70 | 1.49 | 1.31 | .95  | 1.62 | .42 | 1.16 | 1.61 | 2.22 | 1.06 | .59 | .92  | .64  | 1.02 | 4.18 | 27.52 | 3.77 | 1.25 | 2.56 |
| 1962 | 3.93 | 4.81 | 1.31 | 1.32 | .95  | 1.63 | .44 | 1.17 | 1.63 | 2.40 | 1.14 | .62 | .98  | .70  | 1.08 | 4.24 | 25.11 | 4.03 | 1.35 | 2.66 |
| 1963 | 3.52 | 4.30 | 2.21 | 1.53 | .97  | 1.72 | .47 | 1.23 | 1.62 | 2.65 | 1.24 | .60 | 1.05 | .79  | 1.14 | 4.35 | 28.74 | 4.34 | 1.45 | 2.76 |
| 1964 | 3.14 | 4.76 | 2.47 | 1.33 | .97  | 1.73 | .49 | 1.20 | 1.56 | 2.45 | 1.24 | .60 | 1.06 | .82  | 1.19 | 4.37 | 24.50 | 4.76 | 1.40 | 2.79 |
| 1965 | 4.53 | 4.87 | 2.64 | 1.33 | .97  | 1.71 | .49 | 1.13 | 1.49 | 2.65 | 1.30 | .62 | .99  | .89  | 1.22 | 4.34 | 24.51 | 5.06 | 1.72 | 2.84 |
| 1966 | 4.71 | 4.31 | 2.89 | 1.38 | .99  | 1.79 | .55 | 1.25 | 1.49 | 2.85 | 1.37 | .63 | 1.08 | .92  | 1.28 | 4.37 | 26.58 | 5.23 | 1.45 | 2.95 |
| 1967 | 4.39 | 5.33 | 3.38 | 1.52 | 1.00 | 2.02 | .63 | 1.28 | 1.56 | 2.86 | 1.47 | .76 | 1.21 | 1.02 | 1.35 | 4.45 | 27.52 | 5.59 | 1.98 | 3.11 |
| 1968 | 4.45 | 5.22 | 3.60 | 1.45 | .95  | 1.93 | .64 | 1.25 | 1.38 | 2.57 | 1.39 | .67 | 1.19 | 1.06 | 1.38 | 4.23 | 27.53 | 5.86 | 2.13 | 3.07 |
| 1969 | 4.65 | 5.16 | 4.26 | 1.38 | 1.00 | 1.83 | .65 | 1.18 | 1.25 | 2.17 | 1.23 | .64 | 1.17 | 1.06 | 1.36 | 3.98 | 27.69 | 6.20 | 2.24 | 3.31 |
| 1970 | 5.64 | 4.98 | 4.51 | 1.33 | 1.02 | 1.92 | .70 | 1.21 | 1.26 | 2.13 | 1.23 | .61 | 1.18 | 1.09 | 1.38 | 3.63 | 27.59 | 6.45 | 2.32 | 3.03 |
| 1971 | 5.23 | 5.11 | 4.64 | 1.33 | 1.04 | 1.95 | .74 | 1.24 | 1.31 | 2.28 | 1.36 | .63 | 1.15 | 1.14 | 1.43 | 3.83 | 28.51 | 6.72 | 2.45 | 3.13 |
| 1972 | 5.33 | 5.21 | 4.76 | 1.34 | 1.04 | 1.96 | .77 | 1.26 | 1.36 | 2.85 | 1.55 | .64 | 1.03 | 1.18 | 1.48 | 3.82 | 28.66 | 7.10 | 2.57 | 3.21 |

Activities:

|                                 |                   |
|---------------------------------|-------------------|
| 1 - Agriculture                 | 11 - Metals II    |
| 2 - Energy                      | 12 - Vehicles     |
| 3 - Mining, excl.coal, gas, oil | 13 - Machinery    |
| 4 - Quarrying                   | 14 - Construction |
| 5 - Food                        | 15 - Trade        |
| 6 - Textiles                    | 16 - Transport    |
| 7 - Clothing                    | 17 - Dwellings    |
| 8 - Wood, paper, printing       | 18 - Government   |
| 9 - Chemicals                   | 19 - Other        |
| 10 - Metals I                   | 20 - Total        |

Source: Data supplied by Pestel Team, May 1976

Appendix Table III.10.

United Kingdom. Capital/Output Ratios, 1964-1974

| Year | (1)<br>Gross Capital<br>Stock at Re-<br>placement Cost<br>of 1970<br>10 <sup>9</sup> £ | (2)                      (3)<br>G. D. P.        |                                              | (4)                                 | (5)          |
|------|----------------------------------------------------------------------------------------|-------------------------------------------------|----------------------------------------------|-------------------------------------|--------------|
|      |                                                                                        | Factor Cost<br>1970 prices<br>10 <sup>9</sup> £ | Market Price<br>of 1970<br>10 <sup>9</sup> £ | Capital/Output Ratio<br>Factor cost | Market price |
| 1964 | 140.5                                                                                  | 37.7                                            | 44.4                                         | 3.74                                | 3.17         |
| 1965 | 146.6                                                                                  | 38.6                                            | 45.4                                         | 3.80                                | 3.23         |
| 1966 | 152.6                                                                                  | 39.4                                            | 46.3                                         | 3.87                                | 3.29         |
| 1967 | 159.1                                                                                  | 40.4                                            | 47.5                                         | 3.94                                | 3.35         |
| 1968 | 165.9                                                                                  | 41.9                                            | 49.1                                         | 3.96                                | 3.38         |
| 1969 | 172.6                                                                                  | 42.5                                            | 49.7                                         | 4.06                                | 3.47         |
| 1970 | 179.5                                                                                  | 43.3                                            | 50.8                                         | 4.15                                | 3.53         |
| 1971 | 186.4                                                                                  | 44.2                                            | 52.0                                         | 4.22                                | 3.58         |
| 1972 | 193.4                                                                                  | 45.0                                            | 53.4                                         | 4.30                                | 3.62         |
| 1973 | 200.6                                                                                  | 47.3                                            | 56.3                                         | 4.24                                | 3.56         |
| 1974 | 207.7                                                                                  | 47.8                                            | 56.7                                         | 4.35                                | 3.66         |
| 1975 | .                                                                                      | 47.0 <sup>p</sup>                               | .                                            | .                                   | .            |

Sources: Compiled from United Kingdom, Central Statistical Office,  
Annual Abstract of Statistics 1975, table 345, p.328 for col.(1)  
and table 337 p/320 for columns (2) and (3)  
(4) = (1) : (2); (5) = (1) : (3)

p = preliminary